

# In the United States Court of Federal Claims

No. 02-1909C

(Filed Under Seal: April 28, 2006)

(Re-Issued: April 28, 2006)<sup>1</sup>

## TO BE PUBLISHED

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HONEYWELL INTERNATIONAL, INC.,	*	Doctrine of Equivalents;
and HONEYWELL INTELLECTUAL	*	Double Inclusion;
PROPERTIES, INC.,	*	Literal Infringement;
	*	Preponderance of the Evidence;
Plaintiffs,	*	United States Patent No. 6,142,637;
	*	United States Patent No. 6,467,914;
v.	*	28 U.S.C. §§ 1491(a), 1498(a);
	*	35 U.S.C. §§ 100(d), 112, 281;
THE UNITED STATES,	*	RCFC 24(a), 26(a), 52(c).
	*	
Defendant,	*	
	*	
and	*	
	*	
LOCKHEED MARTIN CORP.,	*	
	*	
Defendant-Intervenor.	*	
	*	

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**Lawrence J. Gotts, Mark Koehn, and Elizabeth Miller Roesel**, Pillsbury Winthrop Shaw Pittman, LLP, McLean, Virginia, counsel for plaintiffs.

**John J. Fargo, Christopher L. Crumbley, and Trevor M. Jefferson**, United States Department of Justice, Civil Division, Washington, D.C., counsel for defendant.

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<sup>1</sup> On April 17, 2006, a pre-publication draft of the Memorandum Opinion and Order was provided under seal to the parties and L-3 Communications, a firm that produced confidential information during discovery. The parties and L-3 Communications were instructed to propose any redactions. On April 28, 2006, the court issued under seal the Memorandum Opinion and Order with several clarifying editorial changes that the court made to the April 17, 2006 pre-publication draft. On April 28, 2006, the court also issued this redacted version of the Memorandum Opinion and Order with redactions indicated by the designation “[deleted].”

**MEMORANDUM OPINION AND ORDER REGARDING  
INFRINGEMENT OF UNITED STATES PATENT NO. 6,467,914**

**BRADEN, Judge.**

For the reasons discussed below, the court has determined that Plaintiffs established by a preponderance of the evidence, a *prima facie* case as to literal infringement of Claim 2 of the United States Patent No. 6,467,914 and, alternatively, infringement under the doctrine of equivalents. Plaintiffs, however, have failed to establish by a preponderance of the evidence either literal infringement or infringement under the doctrine of equivalents as to either Claim 1 or Claim 3 of the relevant patent. Before a memorandum opinion and final order regarding infringement is entered, defendants will have the opportunity to present any defenses regarding the infringement of Claim 2. *See* 7/7/05 TR 48-60; TR 535-40.

An outline of this Memorandum Opinion Regarding Infringement of United States Patent No. 6,467,914, and glossary of selected acronyms follows:

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[deleted]
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#### **IV.     CONCLUSION.**

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#### **GLOSSARY OF SELECTED ACRONYMS**

AMLCD	Active Matrix Liquid Crystal Display
ANVIS	Aviators’ Night Vision Imaging System
CIE	Commission International l’Eclairage or International Commission on Illumination
CMDU	Color Multi-Purpose Display Unit
CMFD	Color Multi-Functional Display
CRT	Cathode Ray Tube
IPL	Instrument Panel Lighting
LCD	Liquid Crystal Display
nm	Nanometer
NVG	Night Vision Goggles
NVG Capability	Night Vision Goggles that can function inside an aircraft cockpit
NVIS	Night Vision Imaging System
RGB	Red Green Blue
SED	Spectral Energy Distribution
$\lambda$	Wavelength or the distance between successive peaks of an electromagnetic wave.
nu, $\nu$	Frequency or the number of complete cycles of electromagnetic radiation completed each second.

## I. PROCEDURAL BACKGROUND.<sup>2</sup>

### A. From December 18, 2002 To January 31, 2005 -- Initial Proceedings.

On December 18, 2002, Honeywell filed a Complaint in the United States Court of Federal Claims asserting three claims against the Government allegedly for violating: (1) the Invention Secrecy Act of 1951, 35 U.S.C. §§181-88, as a result of the Government's issuance of an April 2, 1986 Secrecy Order concerning Honeywell's '914 patent and related '269 application;<sup>3</sup> (2) the Fifth Amendment to the United States Constitution, as a result of the Government's taking of Honeywell's '914 patent and related '269 application; and (3) 28 U.S.C. § 1498(a), as a result of the unlicensed, or otherwise unlawful, use of the '914 patent by or on behalf of the Government. *See* Compl. ¶¶ 53-75. The case was assigned to the Honorable Emily C. Hewitt.

On May 23, 2003, the Government filed a Motion to Issue a Notice to Third-Party Lockheed Martin, pursuant to 41 U.S.C. § 114(b) and RCFC 14(b). On June 5, 2003, the court granted the Government's Motion. On June 16, 2003, the Government filed a First Answer. On August 15, 2003, this case was assigned to the undersigned judge.

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<sup>2</sup> The Procedural Background and the Relevant Technology and Factual Background were derived, in part, from: Plaintiffs' December 18, 2002 Complaint ("Compl."); the United States ("Government" or "Gov't"); May 23, 2003 Motion To Issue Notice to Third-Party Lockheed Martin Corp. ("Lockheed Martin"); the Government's June 16, 2003 Answer ("Gov't First Answer"); Defendant-Intervenor's September 3, 2003 Motion to Intervene ("Int. Mot."); Plaintiffs' September 9, 2003 Response thereto ("Pl. Reply to Int. Mot."); Defendant-Intervenor's September 17, 2003 Answer ("Int. Answer"); Plaintiffs' December 23, 2004 Opening Claim Construction Brief ("12/23/04 Honeywell Brief"); Defendants' January 14, 2005 Claim Construction Brief ("1/14/05 Def. Joint Brief"); Plaintiffs' January 21, 2005 Reply Claim Construction Brief ("1/21/05 Honeywell Brief"); Plaintiffs' April 1, 2005 Opening Post-Hearing Brief Regarding Claim Construction ("4/1/05 Honeywell Brief"); the Government's April 1, 2005 Post-Hearing Claim Construction Brief ("4/1/05 Gov't Brief"); Defendant-Intervenor's April 1, 2005 Post-*Markman* Brief ("4/1/05 Int. Brief"); Plaintiffs' Post-Hearing Reply Brief Regarding Claim Construction ("4/15/05 Honeywell Brief"); Government's Post-Hearing Claim Construction Reply Brief ("4/15/05 Gov't Brief"); Defendant-Intervenor's April 15, 2005 Reply to Honeywell's Opening Post-Hearing Brief Regarding Claim Construction ("4/15/05 Int. Brief"); April 15, 2005 Joint Stipulation ("Jt. Stip."); Plaintiffs' May 13, 2005 Amended Complaint ("Am. Compl."); the Government's May 31, 2005 Answer ("Gov't Answer to Am. Compl."); and Defendant-Intervenor's May 31, 2005 Answer ("Int. Answer to Am. Compl.).

<sup>3</sup> Initially, Honeywell asserted that the Government infringed U.S. Patent No. 06/786,268 ("'268 application") and U.S. Patent No. 6,142,637 ("'637 patent"). Subsequently, Honeywell relinquished infringement claims in this case regarding the '268 application and '637 patent. *See* 12/23/04 Honeywell Brief at 1 n.1; *see also* 5/13/05 Honeywell Mot.

**B. From January 31, 2005 To February 3, 2005 - - Proceedings Prior To The Claim Construction Hearing.**

On September 3, 2003, Lockheed Martin filed an Unopposed Motion to Intervene, insofar as Honeywell alleged that the C-130J Hercules aircraft, which is manufactured by Lockheed Martin, incorporated technology claimed in the '914 patent. On September 9, 2003, Honeywell filed a Response to Lockheed Martin's Motion to Intervene. On September 12, 2003, both Lockheed Martin and the Government filed a Reply to Honeywell's Response. On September 17, 2003, the court issued a revised Order granting Lockheed Martin's Motion to Intervene with respect to only Counts III and IV of the Complaint. On September 17, 2003, the court entered an Order setting discovery and pre-trial deadlines agreed to by the parties. On that date, Lockheed Martin also filed an Answer in response to the December 18, 2002 Complaint.

On February 10, 2004, the Government filed an Unopposed Motion for Entry of a Stipulated Protective Order. On February 20, 2004, the court granted the Unopposed Motion and entered a Stipulated Protective Order. On April 30, 2004, the court entered an Order setting the date of a claim construction hearing for December 6-10, 2004, which subsequently was rescheduled to November 29, 2004-December 3, 2004 by a May 14, 2004 Order. On July 9, 2004, the court also issued an Order granting Honeywell's Unopposed Motion for Extension of Time of Certain Discovery Deadlines. On July 16, 2004, the court convened a telephone status conference to discuss discovery matters and questions concerning the claim construction hearing. At the invitation of the court, on July 23, 2004 and July 29, 2004, Lockheed Martin and Honeywell forwarded the court letters expressing suggestions about that hearing. On July 23 and 30, 2004, and August 5 and 17, 2004, the court convened additional telephone status conferences to discuss pending discovery matters. On August 25, 2004, the court vacated the September 17, 2003 and May 14, 2004 Orders and established a revised Scheduling Order setting a new date for the claim construction hearing for January 27, 2005, later re-set for January 31, 2005. In addition, on August 25, 2004, the court issued a Claim Construction Procedures Order proposed by the parties. On August 26, 2004, the court convened another telephone status conference to discuss discovery matters. On August 27, 2004, Lockheed Martin filed a Motion to Compel Honeywell's responses to Interrogatories 3 and 4. On August 30, 2004, Lockheed Martin filed a Motion to Compel Honeywell's response to Interrogatory 17.

On September 13 and 23, 2004, the court convened additional telephone status conferences to discuss discovery matters. On October 4, 2004, Lockheed Martin filed a Motion to Compel Honeywell to respond to requests for admission. On October 5, 2004, the court convened a telephone status conference with the parties. On October 6, 2004, the court issued an Amended Claim Construction Procedures Order and an Amended Scheduling Order setting another telephone status conference with the parties for October 12, 2004.

On October 15, 2004, Honeywell filed an Infringement Claim Chart that stated:

[A]t the present time, Honeywell is not relying upon the doctrine of equivalents to assert infringement[.] Nevertheless, to the extent it is later asserted that any particular element of the asserted claims is not literally met by the identified types of products,



Honeywell reserves the right to contend that there are no more than insubstantial differences between such elements and the corresponding structure of the identified types of products.

On October 18, 2004, Honeywell requested entry of a First Amended Protective Order and opposed Lockheed Martin's requests for admission. On that date, the court also convened a telephone conference to resolve third-party discovery issues. On October 27, 2004, Lockheed Martin filed a Reply. At the November 1, 2004 telephone status conference, the court was advised that the dispute regarding requests for admission had been resolved to the satisfaction of the parties. Accordingly, on November 2, 2004, the court entered an Order to that effect.

On November 10, 2004, defendants filed a Joint Response Chart that asserted Claims 1, 2, and 3 of the '914 patent were invalid, due to:

(1) the existence of documentary and nondocumentary evidence that rendered Honeywell's claims obvious; (2) the insufficiency of the description of the invention to show Honeywell's possession of it; (3) a failure by Honeywell to disclose the best mode for practicing the claimed invention; (4) Honeywell's derivation of the invention from others; (5) the introduction of impermissible new matter to the '914 patent in Honeywell's June 24, 2002 amendment; (6) the misjoinder of inventorship, which led to the granting of the '914 patent (the Government did not join in this defense); (7) the violation of Honeywell's duty to disclose to the second patent examiner the existence of prior art that was material to the PTO granting the '914 patent (the Government did not join in this defense).

On November 15, 2004, Honeywell submitted a Proposed Claim Construction Statement that set forth: (1) Honeywell's proposed claim constructions, including any special or uncommon meanings of words or phrases used in the '914 patent; (2) references from the specification that support, describe, or explain each of the claim elements and/or Honeywell's proposed construction; (3) material in the prosecution history that describes or explains each of the elements of the claim; and (4) extrinsic evidence, where necessary.

On November 16, 2004, the court entered a First Amended Protective Order reflecting changes negotiated by the parties. On November 16, 2004, defendants filed a Motion to Amend Defendants' Joint Response Chart. On November 22, 2004, defendants filed a Joint Proposed Claim Construction Statement, together with the November 22, 2004 Expert Report of Dr. Harry Lee Task.

On December 2, 2004, the court convened a telephone conference to resolve third-party issues concerning the Protective Order. On December 3, 2004, the court entered an Order setting a status conference on December 17, 2004 and amending the due date for the Joint Claim Construction Statement to December 14, 2004. On December 16, 2004, the court entered an Order granting Lockheed Martin's Motion to Amend Defendants' November 8, 2004 Joint Response Chart. Following the December 17, 2004 status conference, the court entered a Second Amended Protective Order. On December 21, 2004, the parties filed a Joint Claim Construction Statement.

On December 23, 2004, Honeywell filed an Opening Claim Construction Brief, together with a four volume appendix, consisting of Exhibits 1-39 (PA1-PA514). On January 14, 2005, the Government and Lockheed Martin filed Defendants' Claim Construction Brief, together with five volumes of Exhibits 1-35 (DE1-DE1036).<sup>4</sup> On January 21, 2005, Honeywell filed a Reply Claim Construction Brief, together with a Supplemental Appendix Exhibits 40-49 (PA515-558). On January 24, 2005, the court convened a telephone conference to discuss this matter. On January 27, 2005, the parties filed a Supplement to the Joint Claim Construction agreeing to the construction of the following terms: "optical filter" and "filter," when used as nouns; "filter" and "filtering," when used as verbs; and "passes," when used as a verb.

**C. From January 31, 2005 To February 3, 2005 -- Claim Construction Hearing And Post-Hearing Proceedings.**

The court held a claim construction hearing from January 31-February 3, 2005. In addition to argument of the parties, the court considered the reports of the parties' experts as direct testimony and heard cross-examination and re-direct.

Following the claim construction hearing, on February 28, 2005 and March 3, 2005, the court convened telephone status conferences, pursuant to which the court issued a March 11, 2005 Scheduling Order regarding post-hearing briefs and discovery deadlines for the August 1-8, 2005 infringement trial.

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<sup>4</sup> On January 12, 2005, without requesting leave, the Government and Lockheed Martin filed a joint brief prior to the claim construction hearing that clearly was produced and authored in large part by Lockheed Martin's counsel. *See* 1/14/05 Def. Joint Brief; *see also* TR 10-16. On January 26, 2005, the court issued a Memorandum Opinion and Order addressing jurisdictional and procedural issues raised by this unilateral action:

The public interest in having transparent judicial proceedings is particularly ill-served where a private party is in fact conducting and funding the Government's defense of a patent infringement case without the Government's public recognition and specific authorization of such. Therefore, if the Government, in fact, has decided to allow Lockheed Martin to "assume and undertake the conduct and control" of this case, [pursuant to Contract No. F33657-00-C0018 page one and an unidentified one page attachment, *see* May 23, 2003 Motion for Notice to Third-Party, pursuant to RCFC(b) (Exhibit 2 at 2(i)(3))], then the Government should advise the court and parties . . . . On the other hand, if the Government, in fact, intends to continue to defend this case, the court expects each party to proceed independently, representing the best interests of each party's respective clients.

*Honeywell Int'l, Inc. v. United States*, No. 02-1909C, slip op. at 4-5 (Fed. Cl. Jan. 26, 2005, amended and reissued on June 14, 2005) (Memorandum Opinion and Order).

Thereafter, the Government reaffirmed that it would conduct a separate defense.

On March 30, 2005, Lockheed Martin filed a Motion to Supplement the Record with three contracts between Lockheed Martin and the Government to support Lockheed Martin's intervention as a matter of right.

On April 1, 2005, Honeywell filed an Opening Post-Hearing Brief Regarding Claim Construction; the Government filed a Post-Hearing Claim Construction Brief; and Lockheed Martin filed a Post-*Markman* Hearing Brief. On April 7, 2005, the court granted Lockheed Martin's March 30, 2005 Motion to Supplement the Record.

On April 15, 2005, Honeywell filed a Post-Hearing Reply Brief Regarding Claim Construction; the Government filed a Post-Hearing Claim Construction Reply Brief; and Lockheed Martin filed a Reply to Honeywell's Opening Post-Hearing Brief Regarding Claim Construction. In addition, on April 15, 2005, the parties filed a Stipulation agreeing to the meaning of six of the contested claims, which are recited herein.

On April 20, 2005, Honeywell filed a Motion for Leave to Supplement the Record Regarding Claim Construction of the term "red color band," together with an April 18, 2004 Declaration of Mark Koehn, Esquire and an April 19, 2004 Declaration of Lawrence E. Tannas, Jr., together with Exhibits 1-13 (PE1-155).<sup>5</sup> Honeywell's Motion requested that the record include the *Draft Standard for Color Active Matrix Liquid Crystal Displays in U.S. Military Aircraft*, WL-TR-93-1177, Darrel Hopper June 1994 (Koehn Ex. 1) and Dr. Hopper's related deposition testimony. On May 4, 2005, the Government filed a Brief in Response to Honeywell's Motion to Supplement, together with three volumes of supporting Exhibits. The Government did not object to Honeywell's request to supplement the record, but requested counter-designations.

On May 4, 2005, Honeywell also filed a letter to bring the recent decision of the United States Court of Appeals for the Federal Circuit in *Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367 (Fed. Cir. 2005) to the attention of the court. On May 5, 2005, Honeywell filed a Supplement to the October 15, 2004 Claim Chart ("5/5/05 Honeywell Supp. to Claim Chart") to amend: Section II of the Claim Chart to clarify that "Honeywell no longer asserts that LED displays are a type of display that infringes the '914 patent when used by the Government"; Section II of the Claim Chart to clarify that "Honeywell no longer asserts that the Cockpit Engineer Display (CED) made by Smiths Industries for B-52H, the Warning Annunciator Panel (WAP) made by Litton Systems/Northrop Grumman for the C-17A, or the Engine/Caution Panel made by Litton Systems for the C-17A are covered by the '914 patent when used by the Government in connection with NVIS"; and Section III of the Claim Chart to remove "the statement at page 9 referencing 'Attachment B: claim chart showing how, on information and belief, '914 claim 1 reads on full color, NVIS compatible, Light-

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<sup>5</sup> On February 25, 2005, Honeywell filed a Motion to Correct the December 23, 2004 Opening Claim Construction Brief. On March 14, 2005, the Government and Lockheed Martin opposed. On March 17, 2005, Honeywell filed a Reply, together with Exhibits A-G. On March 24, 2005, the court entered an Order denying Honeywell's February 25, 2005 Motion, but granting Honeywell leave to discuss any corrections in the post-hearing brief to be filed on April 1, 2005.

Emitting Diode (LED) displays, when used with NVIS.” Honeywell also appears to have withdrawn Attachment B to the Claim Chart. *Id.* On May 6, 2005, the Government filed an unopposed Motion for Leave to File the Declaration of Dr. Darrel G. Hopper (“5/5/05 Hooper Decl.”).

On May 6, 2005, Honeywell filed a Reply in support of an April 20, 2005 Unopposed Motion to Supplement the Record Regarding Claim Construction. On May 9, 2005, the court granted the Government’s May 6, 2005 Motion to File an Original Declaration of Dr. Darrel Hopper.

On May 13, 2005, the court granted Honeywell’s May 13, 2005 Unopposed Amended Complaint dismissing Counts I, II, III, and IV, as they relate to U.S. Patent No. 6,142,637. On that date, Honeywell also filed a Motion to Preclude the Government “from making offensive use of certain documents belatedly produced in violation of the Court’s [First Amended Protective Order and Second Amended Protective Order],” together with the May 11, 2005 Affidavit of Mark Koehn and Exhibits 1-19 (PE1-PE159). On May 25, 2005, the Government filed a Brief in Opposition. On May 26, 2005, the court denied Honeywell’s May 13, 2005 Motion to Preclude. On May 31, 2005, Honeywell filed a Motion for Reconsideration.

On May 31, 2005, Plaintiffs filed an Amended Complaint alleging that the Government and Lockheed Martin infringed Honeywell’s ‘914 patent in violation of 28 U.S.C. § 1498(a) that did not specify whether Plaintiffs were alleging literal infringement or infringement under the doctrine of limitations in the alternative. On May 31, 2005, the Government and Lockheed Martin filed an Answer to Honeywell’s Amended Complaint. On June 8, 2005, the court convened a telephone conference regarding resolution of third-party discovery and issues concerning prior art disclosure discovery.

On June 14, 2005, the court issued a Memorandum Opinion and Order construing certain claims of United States Patent No. 6,467,914 (“the ‘914 patent”). *See Honeywell Int’l., Inc. v. United States*, 66 Fed. Cl. 400 (2005) (“*Honeywell*”). The claims construed were:

“display system”

A system comprised of optical filters that can be used in combination with an aid, with light amplifying, passive, and night vision qualities, and a display of colors that includes a source of light perceptible by the night vision aid. *Id.* at 437.

“local color display”

A device that may be used together or in combination with optical filters and shows or exhibits at least one color perceptible to an observer or observers utilizing a night vision aid. *Id.* at 444.

“local source of light”	An essential element of the local color display that must be perceptible to an observer or observers with a night vision aid. <i>Id.</i> at 447.
“filters light from the local color display”	The starting point for filtering light occurs at the filters. <i>Id.</i> at 453.
“notch filter”	An optical filter that has the capacity both to pass and substantially block light and may be a single-notch filter or a multi-notch filter. <i>Id.</i> at 459.
“color bands” in Claim 1	A range of visible wavelengths that may include all colors visible to the human eye. <i>Id.</i> at 466.
“color bands” in Claim 2(a)	To include the range of wavelengths, within which the colors blue, red, and green are visible to the human eye. <i>Id.</i>
“red color band”	A range of color from 620 nm to 780 nm. <i>Id.</i> at 471.
“substantially blocks”	<u>Claim 1(a):</u> Preventing light from a color display from reaching the night vision aid in a sufficient amount to enable the night vision aid to function. <i>Id.</i> at 482.  <u>Claim 2(b):</u> Preventing light from the narrowband of the red color band from entering the night vision aid. <i>Id.</i> at 487.
“first,” “second,” “third,” “fourth,” and “filter”	Identifies the various members of a group. <i>Id.</i>
“blue color band”	A range of color from 455 nm to 492 nm. <i>Id.</i> at 485.
“green color band”	A range of color from 492 nm to 577 nm. <i>Id.</i> at 487.

The court also recited the following claim language that the parties stipulated to mean as follows:

“optical filter” and “filter”	“[W]hen used as nouns in the claims of the ‘914 patent, mean ‘a device that selectively passes and blocks electromagnetic radiation.’ . . . ‘[F]ilters’ (plural), when used as a noun, means two or more filters.” <i>Id.</i> at 448.
“filter” and “filtering”	“[W]hen used as verbs in the claims of the ‘914 patent, mean ‘selectively to allow (or allowing) light to pass and be blocked.’” <i>Id.</i>
“passes”	“[M]eans ‘allows to go through.’” <i>Id.</i> at 459.
“predetermined color bands”	“[A]s used in Claim 1(a) of the ‘914 patent, requires no further construction aside from the term ‘color band.’” <i>Id.</i> at 466.
“predetermined red color band”	“‘[A] specific range of wavelengths within the red color band.’” <i>Id.</i> at 472.
“narrowband of the red color band”	“[M]eans ‘a narrow range of wavelengths within the red color band.’” <i>Id.</i> at 487.

**D. From February 3, 2005 To August 1, 2005 - - Proceedings Prior To The Infringement Hearing.**

On June 30, 2005, the court convened a telephone conference to discuss issues regarding the submission of expert reports and additional document production by the Government.

On July 7, 2005, a telephone conference was held to discuss document production and procedural issues regarding the upcoming infringement hearing, scheduled to commence on August 1, 2005. With consent of the parties, the court ordered that Honeywell would have the opportunity to establish all claims of infringement as to the ‘914 patent, regarding each of the following three designated display systems:

<u>Aircraft</u>	<u>Display</u>	<u>Display Manufacturer</u>
F-16	CMFD	Honeywell
C-130H	RDU	L-3 Communications
C-140J	CMDU	L-3 Communications

Defendants were expected to produce evidence of non-infringement, but the court deferred requiring the production of evidence of other defenses, such as invalidity, unenforceability, implied license/release, until the issue of literal infringement was determined. *See* 7/7/05 TR 48-60.

On June 17, 2005, Plaintiffs provided the Government and Lockheed Martin with a copy of the report of their expert, Lawrence E. Tannas, Jr., which provided his opinions only regarding literal infringement of the '914 patent. On July 11, 2005, Honeywell filed a Supplement Expert Report of Lawrence E. Tannas, Jr., wherein the Government and Lockheed Martin were advised that expert testimony would address literal infringement, as well as infringement under the doctrine of equivalents. Specifically, Mr. Tannas stated: "In my opinion, the red, green and blue pixel filters of the CMFD, CMDU, and RDU are the same as, or at least equivalent to, the 'first optical filter' in Claim 1 and the 'plurality of filters' in Claim 2." JTX 5.

On July 15, 2005, the court heard argument on a request by Lockheed Martin to exclude Honeywell from seeking to introduce evidence regarding the doctrine of equivalents, as an alternative infringement theory at the upcoming trial. The court deemed Lockheed Martin's request as a motion to strike, which the court denied. The court, however, put Honeywell on notice that it could proceed with the case-in-chief on infringement and argue all available infringement theories, including the doctrine of equivalents. Assuming that Honeywell met its burden of proof to establish a *prima facie* case of infringement under the doctrine of equivalents, the Government and Lockheed Martin would have an opportunity to conduct limited additional discovery and the court would schedule a hearing on any defenses to the doctrine of equivalents and afford Honeywell rebuttal. *See* 7/21/05 Amended Order. Thereafter, the court would issue a Memorandum Decision and Order as to whether or not Honeywell's patent was infringed under the doctrine of equivalents. *Id.* All parties concurred in this procedural resolution. *See* 7/15/05 TR 53-63. The court also decided that, if necessary after deciding infringement, the court will "schedule further proceedings to address remaining issues such as invalidity, inequitable conduct, implied license/release, damages, and the secrecy order and takings claims." 7/21/05 Amended Order.

On July 19, 2005, the court convened a telephone conference concerning a third-party subpoena issued by Lockheed Martin. On July 26, 2005, the court also held a pre-trial conference to discuss logistics regarding the August 1, 2005 infringement hearing.

#### **E. From August 1, 2005 To August 8, 2005 - - Infringement Hearing.**

##### **1. Evidence Introduced In Plaintiffs' Case-In-Chief.**

Honeywell called two factual witnesses at the infringement hearing: Ms. Loria Yeadon and Mr. Ted Wood. Ms. Yeadon was Chief Executive Officer of Honeywell Intellectual Properties, Inc., the entity that manages the "intellectual property asserts" of Honeywell International, Inc. and affiliates. *See* TR 76-77, 80. Ms. Yeadon testified that Honeywell Intellectual Properties, Inc. is the owner of the '914 patent and that the parent, Honeywell International, Inc., is the exclusive licensee. *See* TR 92; *see also* TR 95-103. Ms. Yeadon also confirmed that the chain of title from the filing of the '914 patent application to the present. *See* TR 95-103. Honeywell also called Mr. Ted Wood, a

Senior Fellow Engineer at Honeywell, who testified about the CMFD in the F-16 aircraft. *See* TR 120-233; *see also* PTX 266, PTX 267, PTX 268, PTX 270, PTX 443, PTX 444, PTX 445.

In addition, Honeywell proffered deposition testimony of five other fact witnesses: (1) Mr. Marvin Most, an Avionics Engineer at Wright Patterson Air Force Base and the Government's Rule 30(b)(6) witness regarding the CMFD in the F-16 aircraft, *see* JTX 76 (Most 6/24/05 Dep. with Exhibits); *see also* JTX 48, 50, 51; (2) Mr. Kevin Walsh, a Staff Engineer Optics Design with L-3 Communications, the manufacturer of the CMDU and RDU, regarding the key components of the RDU and CMDU displays, *see* JTX 79 (Walsh 5/19/05 Dep. with Exhibits); PTX 310 (Walsh 7/27/05 Dep. with Exhibits); *see also* JTX 4, JTX 19, JTX 21, JTX 25, JTX 27, JTX 38, JTX 39; PTX 222, PTX 223, PTX 295, PTX 296, PTX 297, PTX 299; (3) Mr. David W. Battle, an Engineer at Warner Robbins Air Force Base and the Government's Rule 30(b)(6) witness regarding the RDU display in the C-130H aircraft, *see* PTX 77 (Battle 6/23/05 Dep. with Exhibits); *see also* JTX 21, JTX 25, JTX 27; PTX 222, PTX 223; (4) Mr. William Slusher, an Engineer at Wright Patterson Air Force Base and the Government's Rule 30(b)(6) witness regarding the CMDU display in the C-130J aircraft, *see* PTX 292 (Slusher 6/23/05 Dep. with Exhibits); *see also* JTX 38, JTX 39; PTX 297; and (5) Mr. Daniel Sullivan, an Engineer at Wright Patterson Air Force Base and the Government's Rule 30(b)(6) witness regarding the CMDU display in the C-130H aircraft, *see* JTX 78 (Sullivan 6/23/05 Dep. with Exhibits); *see also* TR 778-80.

Honeywell also proffered expert testimony of Mr. Lawrence E. Tannas, Jr. *See* PTX 446 (Tannas 7/31/05 Direct); JTX 5 (Tannas 7/11/05 Supplement to 6/17/05 Expert Report); *see also* TR 363-472, 480-563, 571-777, 894-1014, 1087, 1147-158 (Tannas). The parties stipulated that Mr. Tannas is an expert in the fields of "electronic displays, including display systems, commercial and military cockpit displays, filters and filter technology, color science as it relates to electronic displays, and night vision goggle compatibility as it relates to electronic displays." TR 364.<sup>6</sup> On August 3,

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<sup>6</sup> Mr. Tannas received a B.S. and M.S. degree in Engineering from the University of California. *See* PTX 446 (Tannas Direct) ¶ 2. Mr. Tannas has had more than 25 years of "hands-on" experience with avionic cockpit displays, including research and development, manufacturing, testing, and human factor analysis. *Id.* ¶¶ 1-35. Mr. Tannas worked for Honeywell in the early 1960's during which time he invented the backup reentry guidance display for the Apollo Reentry Vehicle, which was used in the Apollo 13 mission. *Id.* ¶ 13. Subsequently, Mr. Tannas was employed at Martin Marietta Corp. where he developed a cockpit for the SV5 Manned Space Vehicle. *Id.* ¶ 14. Prior to starting his own firm in 1999, Mr. Tannas also was employed by Rockwell International where he developed the engineering prototype of a liquid crystal display for the world's first full-scale LCD production. *Id.* ¶¶ 15, 20. Mr. Tannas currently is President of Tannas Electronics, an entity involved in consulting, lecturing, and research. *Id.* ¶ 19. In addition, he is President of Tannas Electronic Displays, Inc., which is involved in research, development, and licensing of intellectual property for preparing LCDs for avionics. *Id.* ¶ 27.

Mr. Tannas has served as a consultant or lecturer for Fortune 500 companies, several universities, and federal agencies, including the Federal Aviation Administration, National Aeronautics and Space Administration, United States Air Force, United States Navy, National



2005, at the close of Honeywell's case-in-chief, the Government moved to strike paragraphs 207 through 212 of Mr. Tannas' direct testimony, because it was not disclosed, as required by RCFC 26(a). *See* TR 532. Lockheed Martin joined that motion. *Id.* The court re-stated the ruling made on July 15, 2005. *See* TR 535-40.

In addition, the court admitted the following Plaintiffs' Trial Exhibits: PTX 2, 3, 5-7, 12-33, 68-100, 102-104, 106-115, 117, 119, 121, 122, 124, 132, 138, 139, 143, 187-199, 218-223, 242-247, 249, 250, 253, 253IIA, 253IIB, 255, 256, 265-273, 275-277, 278, 289, 295-309, 312-314, 316, 317, 401-445, 447-451, 456, 457.

At the close of Honeywell's case-in-chief on infringement, the parties separately moved that the court enter a judgment as a matter of law, pursuant to RCFC 52(c). *See* TR 783-86. The court deferred ruling. *See* RCFC 52(c) ("[T]he court may decline to render any judgment until the close of all evidence.").

## **2. Evidence Adduced By The Government.**

The Government called one fact witness as to non-infringement: Mr. James C. Byrd, a Technical Expert in the Aeronautical Center at Wright Patterson Air Force Base. *See* TR 793-851. In addition, the Government proffered the deposition testimony of Mr. Richard Cohen, the inventor of the '914 Patent. *See* TR 867.

The Government also proffered expert testimony of Dr. Harry L. Task. *See* DE 138A-I (Exhibits), DE 202 (Direct), DE 204 (Addendum); *see also* TR 852-65, 1015-120. The parties stipulated that Dr. Task is an expert in the fields of "human factors and optical science, including . . . color imagery, photometry, and radiometry, as well as in the fields of displays, night-vision goggles and the interaction and compatibility of displays with night vision goggles." TR 858.<sup>7</sup>

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Science Foundation, Defense Advanced Research Projects Agency, and the Central Intelligence Agency. *Id.* ¶¶ 7, 9. Mr. Tannas also is an inventor or co-inventor of eight patents issued by the USPTO. *Id.* ¶ 26. He has authored or co-authored numerous publications, including serving as author/editor of *Flat-Panel Displays and CRTs* (Van Nostrand Reinhold Co., 1985) and *Flat-Panel Display Technologies, Japan, Russia, Ukraine, and Belarus* (Noyes Publications, 1995). *See* PTX 3, PTX 32. In addition, Mr. Tannas has been a coordinator and lecturer on flat-panel displays, human factor analysis, and advance cockpit displays at University of California at Los Angeles and other universities. *See* PTX 446 (Tannas Direct) ¶¶ 9, 10.

<sup>7</sup> Dr. Task has had more than 27 years of "hands-on" experience with research and development in helmet mounted displays, display image quality, vision assessment in space, night vision goggles, night vision goggle compatible lighting, and vision through aircraft transparencies. *See* DE 202 ¶¶ 1-4. Dr. Task has a B.S. degree in Physics from Ohio University, a M.S. in Physics from Purdue University, a M.S. and Ph.D. in Optical Sciences from the University of Arizona Optical Sciences Center, and a M.S. in Management of Technology from the Massachusetts Institute

At the close of the Government's case, Honeywell again moved that the court enter judgment as a matter of law, pursuant to RCFC 52(c). *See* TR 868-71. The court again declined to rule on Honeywell's motion until after briefing was concluded. *See* TR 871.

In addition, the court admitted the following Defense Exhibits: DE 3, DE 24, DE 43, DE 48-64, DE 118, DE 143, DE 146, DE 160-165, DE 168-181.

### **3. Evidence Adduced By The Intervenor.**

Lockheed Martin proffered, as to non-infringement, the May 19, 2005 deposition of Mr. Kevin Walsh with exhibits; the July 27, 2005 deposition of Mr. Kevin Walsh (PTX 310) with exhibits; the June 23, 2005 deposition of Mr. Daniel Sullivan (JTX 78) with exhibits; the September 14, 2004 deposition of Mr. Craig Scoughton (DE 61) with exhibits; the September 21, 2004 deposition of Mr. Richard Cohen (DE 54) with exhibits; and the June 29, 2005 deposition of Robert J. Saccammano (DE 43) with exhibits. *See* TR 878-79.<sup>8</sup> The court admitted the following Intervenor Trial Exhibits: ID 1-4, ID 7, ID 8, ID 11-30, ID 38-39, ID 42-82, ID 85-87, ID 89-94, ID 119-135. *See* TR 883. In addition, the court admitted seventy-nine Joint Trial Exhibits ("JTX" 1-79). At the close of Lockheed Martin's case, Honeywell moved that the court enter judgment as a matter of law, pursuant to RCFC 52(c). *See* TR 887. Again, the court declined to rule until briefing was completed. *Id.*

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of Technology, Sloan School of Management. *Id.* ¶¶ 1, 2.

In 1971, Dr. Task was hired by the United States Air Force Aerospace Medical Research Laboratory ("AMRL") as an optical physicist to work on helmet mounted displays and display image quality. *Id.* ¶ 2. In 1989, Dr. Task became the Chief Scientist for AMRL and served in that capacity until 1991. *Id.* In 1997, Dr. Task became the Senior Scientist for Human Systems Interface for the United States Air Force Research Laboratory, a position equivalent to a one-star General. *Id.* In June 2001, Dr. Task retired from the United States Air Force, but has continued technical work as a consultant. *Id.* ¶ 4. Since his retirement in June 2001, Dr. Task has been an independent consultant and President and Treasurer for Opto-Metrix, Inc., a Subchapter "S" corporation that makes and sells optical protractors. *Id.* ¶ 1.

Dr. Task also is the inventor or co-inventor of approximately 45 patents issued by the USPTO, author or co-author of over 100 technical-research publications, a member of relevant professional associations, including the Society for Information Display, and a Fellow of the American Society for Testing and Materials. *Id.* ¶ 3. He was retained as an expert in vision and visibility in approximately a dozen cases involving vehicle accidents at night or dusk, however, none concerned NVGs or NVG compatible lighting. *Id.* ¶ 4.

<sup>8</sup> Honeywell objected to the admission of the deposition of Mr. Saccammano into evidence. *See* TR 880-81. The court has allowed admission of this deposition, but has not relied on it in issuing this Memorandum Opinion and Order.

## **F. Proceedings Following The Infringement Hearing.**

On September 23, 2005, Honeywell filed an Opening Post-Trial Memorandum (“Pl. PT Mem.”). On October 23, 2005, the Government filed a Post-Trial Memorandum (“Gov’t PT Mem.”). On October 24, 2005, Lockheed Martin filed a Reply Post-Trial Brief (“Int. Reply”). On November 9, 2005, Honeywell filed a Post-Trial Reply Memorandum (“Pl. PT Reply”). On November 14, 2005, Lockheed Martin filed a Sur-Reply Post-Trial Brief (“Int. Sur-Reply”). On November 17, 2005, the Government filed a Post-Trial Sur-Reply Brief (“Gov’t PT Sur-Reply”). On November 21, 2005, Honeywell filed a Post-Trial Sur-Sur-Reply Brief (“Pl. PT Final Br.”).

## **II. THE RELEVANT TECHNOLOGY AND FACTUAL BACKGROUND.**

In 1973, a second-generation of Night Vision Goggles (“NVG”) was developed by the United States Army to provide helicopter pilots with a brighter night view of underlying terrain, allowing flight at low levels. *See* January 24, 2005 Technology/Industry Primer (“Jt. Primer”) at 3.<sup>9</sup> NVGs are very sensitive to cockpit lighting, warning lights, and displays - particularly to light of longer wavelengths in the visible spectrum and infrared radiation. *Id.* at 6-8.

NVG sensitivity to red light, however, created numerous problems known prior to the October 10, 1985 filing of the patent at issue in this case. *Id.* For example, nearby light sources in a cockpit can overwhelm the sensor elements and interrupt NVG functioning or amplify reflections from the cockpit lights, causing the pilot to see confusing images. *Id.*

Over the years, the United States military and private companies utilized numerous techniques to solve incompatibility between the NVG and aircraft lighting and cockpit displays. *See* PMX 35 ¶¶ 8-12 at 4-6. In the 1980’s, the United States Army began to utilize Aviation Night Vision Imaging System (“ANVIS”) goggles with a third-generation image intensifying tube that was much more sensitive to light. *See* Jt. Primer at 3. As a result, the visible wavelength range below 580 nanometers (“nm”) could be used for cockpit lighting and display, because light in that range was invisible to NVGs, in large part, but allowed the pilot to see outside the aircraft. *Id.*

### **A. Night Vision Aids.**

#### **1. The Electromagnetic Spectrum.**

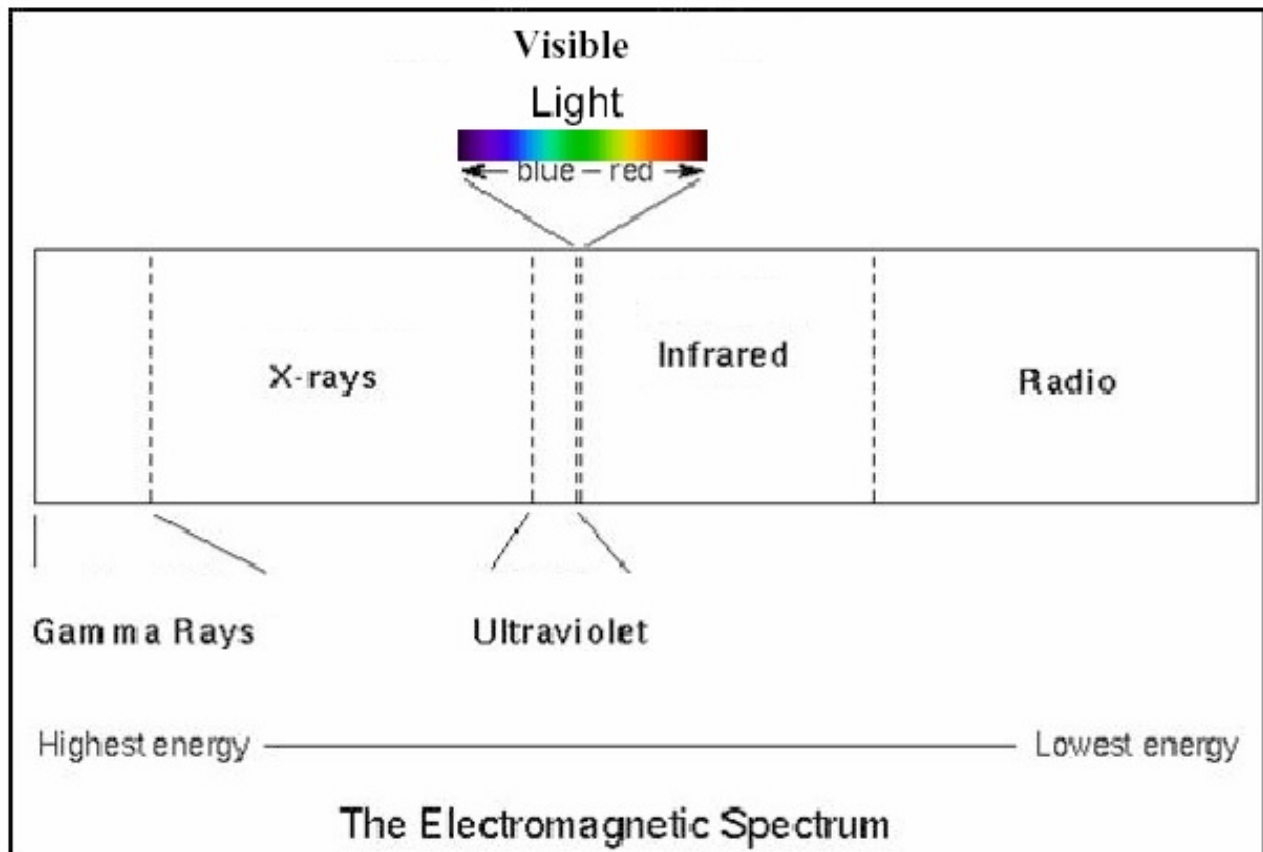
The electromagnetic spectrum (“spectrum”) describes the range of wavelengths that transport energy, both in electric and magnetic fields. *Id.* at 3. Energy from cosmic rays have the shortest

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<sup>9</sup> Counsel collaborated in preparing this document to provide the court with some technical background about the relevant technology, however, the parties agree that Primer is not evidence nor a stipulation as to fact or law. *See* Jt. Primer at 2.

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wavelengths; electrical oscillations have the longest wavelengths. *Id.* “Visible spectrum” or light is the portion of the spectrum located between the ultraviolet light region and the infrared region, as depicted in the following exhibit:



*Id.* at 4.

Light is characterized by wavelength and frequency. *Id.* Wavelength, referred to by the symbol lambda,  $\lambda$ , is the distance between successive peaks of an electromagnetic wave. *Id.* Frequency, referred to by the symbol nu,  $\nu$ , is the number of complete cycles of electromagnetic radiation completed each second. *Id.* Wavelength and frequency are inversely related, *i.e.*, light with a higher frequency has a shorter wavelength; light with a shorter frequency has a longer wavelength. *Id.* at 4-5. Wavelength times frequency equals the speed of light. *Id.* at 5. Light and infrared radiation customarily are described in terms of wavelength. *Id.*

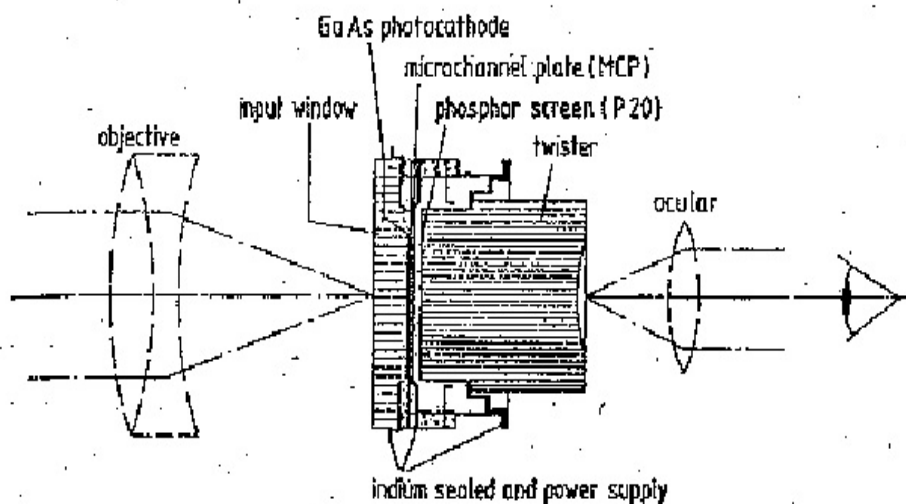
## 2. Night Vision Goggles.

NVGs are sensitive to visible light and infrared radiation regions of the electromagnetic spectrum. *Id.* at 5. An unaided human eye only can see light within the visible region of the electromagnetic spectrum, which has a narrow range, as shown above. *Id.* The human eye adapts to different lighting environments and has two distinct sensitivity curves.

The peak sensitivity of the human eye drifts toward shorter wavelengths of light in extreme darkness, known as scotopic vision, which is rarely used in human activities. *Id.* at 6. Colors seen by day vision are known as photopic vision. *Id.* Radiant energy, originating from the sun during the day and the stars or moon at night, is the electromagnetic energy that the human eye detects. *Id.* At night, there is less visible light present than during the day, so that the human eye has extreme difficulty in detecting the radiant energy that remains. *Id.*

Night vision aids enable the user, *i.e.*, a pilot, to see objects at night by amplifying very low levels of radiant energy from the visible and infrared spectrum. *Id.* Some night vision aids are capable of amplifying the radiant energy reflected from an object at night in overcast conditions. *Id.*

NVGs utilize a “two-step energy conversion process” to enable the user to observe very low levels of light and infrared radiation and convert the latter into visible light: first, by converting photons into electrons and amplifying the electrons; and second, by converting the amplified electrons back into photons, in visible light to the user. *Id.* at 7-8. A schematic of a typical night vision aid is reproduced below:



**SCHEMATIC OF A NIGHT VISION AID**

*Id.* at 7.

Low-level radiation first enters the NVG at an objective lens that focuses low levels of light and infrared radiation onto an input window of an intensifier tube. *Id.* The intensifier tube consists of a photocathode and a microchannel plate (“MCP”) that amplifies light and infrared radiation. *Id.* The photocathode converts photons into electrons. *Id.* Electrons are then emitted from the cathode and received at the input surface of the MCP, generally constructed of a honeycomb-like plate of many hollow tubes fused together. *Id.* Each electron passing through the tube frees other electrons,

creating tens of thousands of electrons that exit the tube for each electron that entered the tube. *Id.* at 7-8.

Exiting electrons strike a phosphor screen that acts as the reverse of the photocathode and converts the electrons back into photons of visible light at a higher intensity than the input photons. *Id.* at 8. If an observer uses an ocular lens, the light emitted appears as a green image. *Id.* This energy is increased by a factor of 10,000 to 20,000 at maximum sensitivity and is known as “gain” or “image intensification” in the NVGs. *Id.* Although NVGs amplify low level light and infrared radiation by a factor of 10,000 to 20,000, they also amplify normal level and bright lights, such as streetlights or cockpit lights, by the same factor, which can damage the NVGs. *Id.* To prevent this problem, ANVIS goggles were developed that have a feature known as “automatic gain control” to govern image intensification within the MCP. *Id.* This reduction of intensification, however, affects the entire field of ANVIS goggles, preventing the user from seeing dimly illuminated objects when normal level and bright lights are introduced. ANVIS goggles also are sensitive to light from about 540 nm to 910 nm. *Id.* at 8. To address this issue, ANVIS goggles utilize a “minus blue” filter that reduces the sensitivity of the goggles to the longer wavelengths. *Id.*

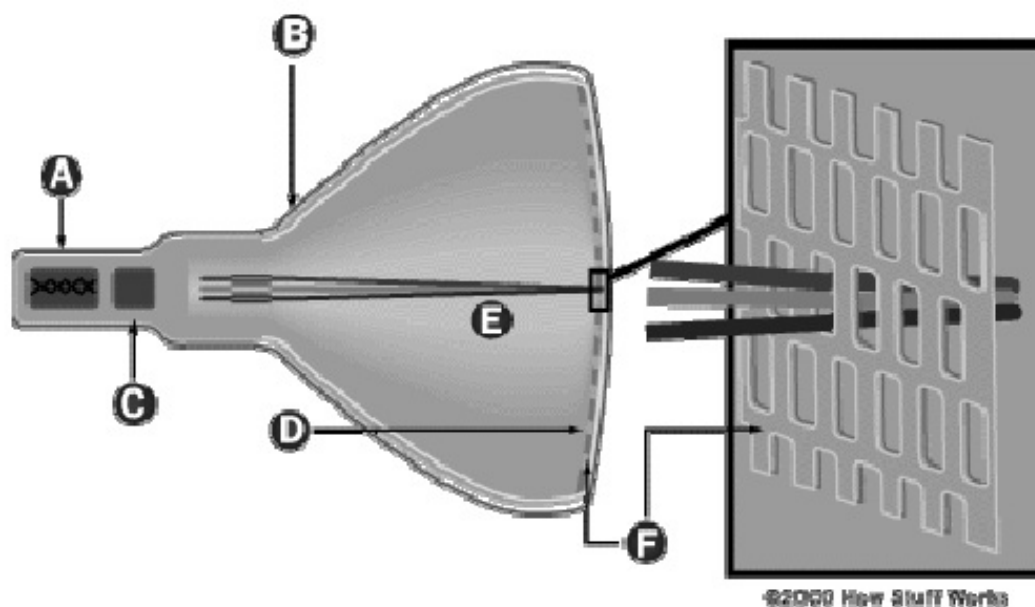
## **B. Cockpit Displays.**

A multi-function cockpit display is used in aircraft as the primary flight instrument and to display radar, video, engine instruments, or other functions. *See* TR 814. Primary flight instruments are those on which the pilot relies to fly the aircraft, such as the altitude indicator, air speed indicator, and altimeter. *Id.* A cockpit display must be NVG compatible so that the pilot can see outside the airplane at night. *See* TR 815. NVGs are very sensitive to dim night light. *Id.* The “compatibility criteria” is based on sharing the visible spectrum, because NVGs “see” the longer wavelengths part of the spectrum, leaving the rest of the visible spectrum available for light from the cockpit. If a cockpit is NVG compatible, the displays are visible to the human eye by looking underneath the night vision goggle. *Id.*

Cathode ray tubes (“CRTs”) and liquid crystal displays (“LCDs”) generate or reflect light that can interfere with the operation of the NVG. *Id.* at 9-11.

### **1. Cathode Ray Tubes.**

CRTs are “picture tube for television” technology used in a broad range of commercial and military applications, including aircraft displays. *Id.* at 9. CRTs operate by receiving an input that is processed by generating electron beams that strike a screen coated with one or more layers of phosphor, wherein each layer can generate one or more colors in a color display. *Id.* When an electron beam strikes a particular phosphor, a phosphor dot on the screen is excited to emit light of a certain color. *Id.* at 10. Full-color CRTs typically have three phosphors that correspond to the three most common primary colors: red, green, and blue. *Id.* There are other sets of primary colors that can produce many more colors in the visible spectrum. *Id.* Prior to the advent of flat screen technologies, every computer monitor and television used a CRT, similar to that shown below:

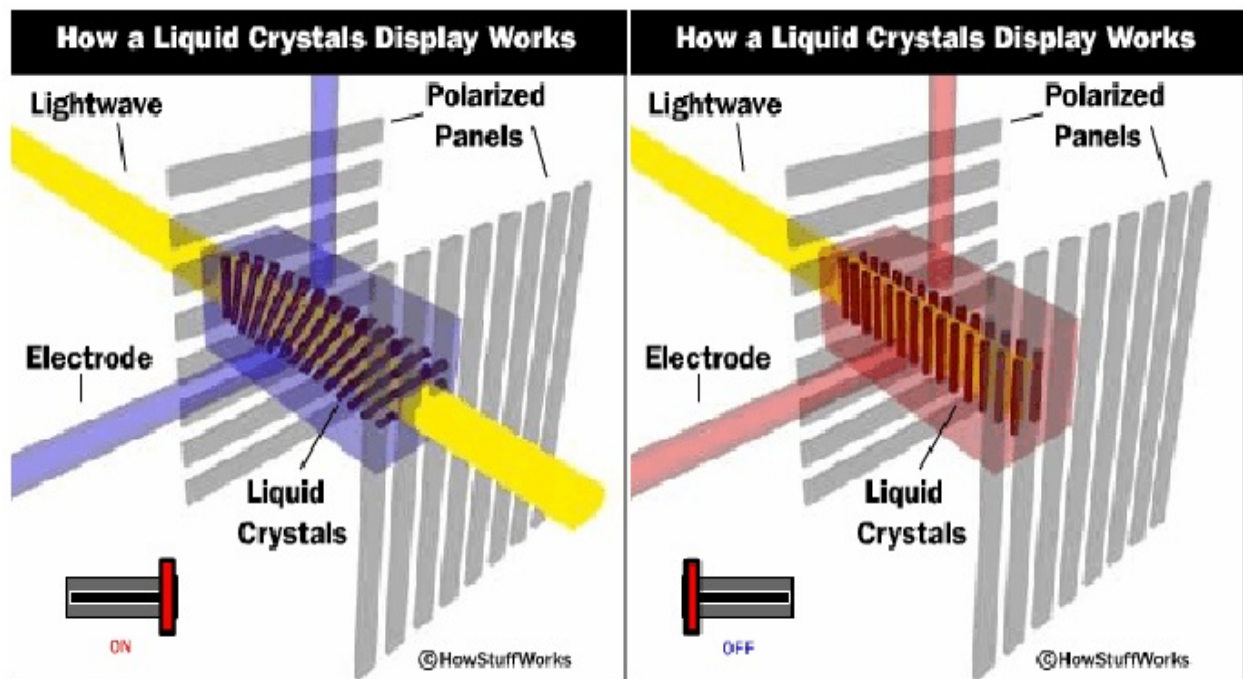


**SCHEMATIC OF A CATHODE RAY TUBE**  
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*Id.* at 9.

## 2. Liquid Crystal Displays.

LCDs are used in many commercial applications, including aircraft cockpit displays. *Id.* In transmissive LCDs, light is generated at the back of the display using a fluorescent tube, known as an LCD backlight. *Id.* This tube has a phosphor coating on the inside that emits light when excited by mercury vapor, which produces color, determined by the chemical characteristics of the phosphors. *Id.* Light is then passed through an array of liquid crystal picture elements or pixels. *Id.* Each liquid crystal pixel also acts as a “shutter” that either passes or blocks the light in varying degrees. *Id.* at 10-11. An LCD is comprised of two polarizing filters and a cavity containing a liquid crystal compound. *Id.* at 10. When electricity is not applied to a pixel, the backlight is polarized by the first polarizer, which permits light to pass through to the second polarizer. *Id.* In a color LCD, each pixel has three subpixels that correspond to the three primary colors of the display. *Id.* at 11. When electricity is applied, the two polarizers act together to block the backlight, as shown below:



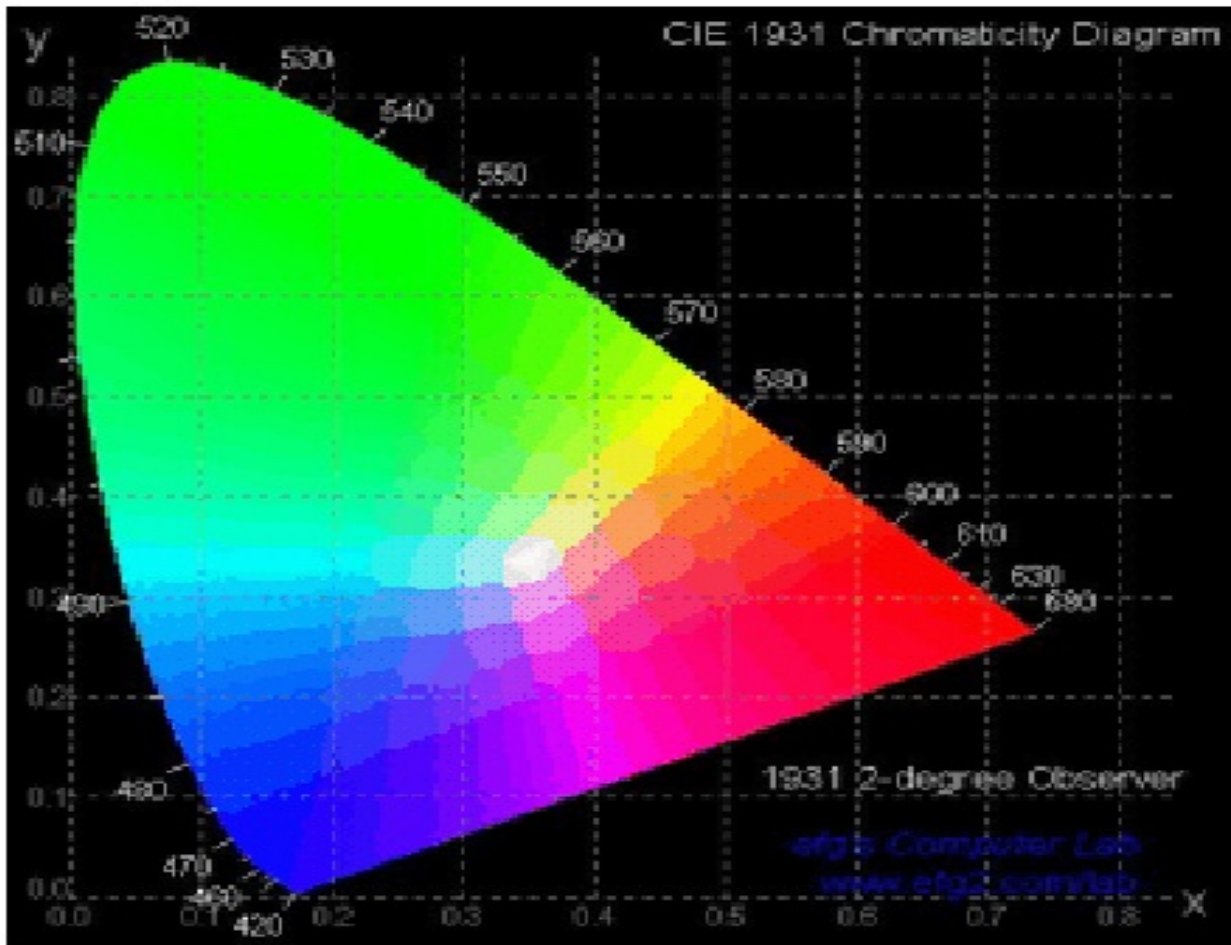
**SCHEMATIC OF A LIQUID CRYSTAL DISPLAY**  
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*Id.* at 11.

### 3. Color.

Color is a psychological response to different wavelengths of light based on the human perception. *Id.* at 12. How color is perceived depends upon the amount of energy light has at each wavelength. *Id.* Spectral energy distribution (“SED”) shows the relative intensity of light at each wavelength. *Id.* SED, however, is not useful for identifying specific colors. *Id.* In 1931, the Commission International l’Eclairage or International Commission on Illumination (“CIE”) developed a system for identifying specific colors by measuring the chromaticity of light. The CIE system, which uses the diagram reproduced below, is well known and widely accepted. *Id.*





### 1931 C.I.E. CHROMATICITY DIAGRAM

*Id.* at 13.

All existing colors can be represented by a single point on the CIE Diagram, as plotted on chromaticity coordinates (x,y). *Id.* The upside-down u-shaped perimeter of the diagram represents the 100% saturated, or pure spectral colors. *Id.* Colors, however, desaturate or become more and more pastel toward the center, until they are white. *Id.* Every color can be correlated to a dominant wavelength or complimentary dominant wavelength. *Id.*

#### C. Characteristics And Types Of Optical Filters.

Optical filters are devices that selectively pass or block electromagnetic radiation. *Id.* at 14. Whether radiation is passed or blocked is based upon a transmissive spectrum that shows wavelengths that have high transmittance (passing) and low transmittance (blocking). *Id.* Typically, filters derive their names by the way the transmittance graph looks. *Id.* For example, filters that pass shorter

wavelengths and block longer wavelengths are called “low-pass filters.” *Id.* Filters that pass longer wavelengths and block shorter wavelengths are “high-pass filters.” *Id.*

A combination of optical filters can create a filter with properties that are cumulative, *i.e.*, the combination of a “high-pass filter” that passes light above 500 nm and a “low-pass filter” that passes light below 600 nm will result in light being passed in the 500 nm to 600 nm range. *Id.* The transmittance values of filters are multiplied, wavelength by wavelength, to calculate the cumulative effect. *Id.*

#### **D. United States Patent No. 6,467,914.**

In the mid-1980’s, Mr. Richard Cohen, an Allied Bendix Corp. employee, began to work on methods for allowing red light and full color displays to be used in cockpits in the NVGs. *See* DE 54 at 173-74. Mr. Cohen testified that at that time display systems and filtering techniques produced orange light, rather than a true red. *Id.* at 220-22. To achieve a true red in the color display, Mr. Cohen used notch or narrowband filters on the displays and a complementary filter on the NVG. *Id.* at 353-54.

On October 10, 1985, Allied Bendix filed a United States Patent Application Serial No. 06/786,269 (“‘269 application”) for this invention. *See* JTX 1. In 1985, Allied Bendix merged with Signal Companies. In late 1999, Allied Signal merged with Honeywell International, Inc. *See* TR 123. As a result, Honeywell International, Inc.’s subsidiary, Honeywell Intellectual Properties, Inc., became the owner of the ‘269 patent application and Honeywell International, Inc. became the exclusive licensee. *See* TR 95-103. On April 2, 1986, the issuance of the patent was withheld because of a Secrecy Order. The Secrecy Order was rescinded on September 7, 2000.

On October 22, 2002, United States Patent No. 6,467,914 (“‘914 patent”) was issued, from the ‘269 patent application describing the technical problem of “a night vision aid, such as ANVIS goggles, be[ing] operable in a cockpit or similar environment in which a full color display is illuminated.” JTX 1 (‘914 patent, col. 2, ll. 2-5). The ‘914 patent has three Claims: Claims 1 and 2 are independent; Claim 3 is dependent upon Claim 2. *Id.* (‘914 patent, col. 5, l. 30 - col. 6, l. 31).

Claim 1 describes:

A display system for use in association with a light amplifying passive night vision aid and a local color display including a local source of light, comprising:

(a) a first optical filter that filters light from the local color display, wherein said first optical filter is a notch filter that passes light comprising predetermined color bands including a predetermined red color band and that substantially blocks light associated with color bands other than said predetermined color bands; and

(b) a second optical filter that filters light at the night vision aid, wherein said second optical filter substantially blocks light of at least said predetermined red color band.

*Id.* ('914 patent, col. 5, l. 30 - col. 6, l. 11).

Claim 2 describes:

A display system for use in association with a light amplifying passive night vision aid and a local color display including a local source of light having blue, red, and green color bands, comprising:

(a) a plurality of filters at the local color display including (1) a first filter for filtering the blue color band of the local source of light; (2) a second filter for filtering the green color band of the local source of light; and (3) a third filter for filtering the red color band of the local source of light and passing a narrowband of the red color band; and

(b) a fourth filter which filters light at the night vision aid, said fourth filter cooperating with said plurality of filters to substantially block at least said narrowband of the red color band from being admitted to the night vision aid.

*Id.* ('914 patent, col. 6, ll. 12-28).

Claim 3 describes:

The display system of claim 2 wherein said narrowband of the red color band is substantially five to twenty nanometers wide.

*Id.* ('914 patent, col. 6, ll. 29-31).

## **E. The Alleged Infringing Military Aircraft Cockpit Displays.**

The following military aircraft cockpit displays utilize active matrix liquid crystal display ("AMLCD") technology that Honeywell alleges infringe the '914 patent (hereinafter collectively referred to as "the designated displays").

### **1. F-16 Air Force Fighter Jet Display - - Manufactured By Plaintiffs.**

In the mid-1990's, the Air Force upgraded many existing F-16 fighter jets and installed color multifunction displays ("CMFDs") manufactured by Honeywell. *See* TR 134-35 (Wood), 812-13 (Byrd). The CMFDs were installed in the F-16 aircraft along with F49496 or HAN/AVS-9 NVGs manufactured by ITT Night Vision. *See* PTX 104 at Ex. 1. The NVGs are Class C goggles designed to be used with Class B compliant displays, such as the CMFDs installed in the F-16s. *Id.*

The CMFD has a full color AMLCD display comprised of two units: a backlight assembly (see PTX 266) and a LCD glass assembly. See PTX 267. The backlight assembly has two lights. See TR 155 (Wood). One generates light that is emitted by the display during the day. *Id.* The other is a night backlight that is operated only at night when the display must be compatible with NVGs. See JTX 76 (Most Dep. at 71, 76-78); see also TR 154-55 (Wood). The night backlight is covered by a lamp filter that enables light emitted from the display to be compatible with the NVGs, by blocking light above 660 nm and passing light at lower wavelengths. See PTX 253, PTX 255; see also TR 175-77, 185-93 (Wood),<sup>10</sup> 622 (Tannas testified that the red color band is split in the CMFD display at approximately 650 nm).

The light emitted from the backlight assembly passes through a separate LCD glass assembly that contains the liquid crystal display for the F-16. See TR 149 (Wood citing PTX 267), 193-94 (Wood). PTX 266 and PTX 267 together comprise an “engineering unit.” TR 149 (Wood citing PTX 266); see also TR 153 (Wood citing PTX 270C, PTX 270D (pictures of lamp filter)).<sup>11</sup> The LCD glass is “the element that does generate a full color image that can be used by the pilot. The lighting system provides the light that can pass through the liquid crystal display . . . it’s basically just a shutter. It doesn’t emit light by itself. But it’s able to modulate the light to produce the full color image.” TR 192-93 (Wood); see also JTX 17 (F-16 CMFD NVIS Radiance).

Together PTX 266 and PTX 267 are known as a “display head assembly,” where “[a]ll of the electronics associated with creating the light and the image on the display [are located]. There’s an electronics half that fits on the back, which makes the box roughly 13 inches long. That electronics unit then drives this half of the display to generate the image[.]” TR 150 (Wood).

## **2. C-130J CMDU Displays - - Manufactured By L-3 Communications.**

Lockheed Martin utilizes four configurations of the C-130J: 1) the KC-130J Tanker; 2) the FC-130J Special Operations; 3) the WC-130J Weather Birds; and 4) the CC/C 130J Combat Delivery. See Int. Reply at 5 (citing JTX 53). At present, Lockheed Martin has entered into four contracts with the Government to produce and deliver the C-130J, pursuant to which 64 of the 117 C-130Js were delivered as of October 24, 2005. See Int. Reply at 5 (citing JTX 53); see also TR 813 (Byrd).

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<sup>10</sup> At the infringement hearing, Mr. Wood testified that the CMFD has more than 500 components, of which only three were “critical,” *i.e.*, the lamp used to generate light for the night mode; a filter over that lamp; and the “actual LCD that’s used to generate the full color display.” TR 146-47.

<sup>11</sup> PTX 266 includes a “small lamp that’s contained within . . . metal housing . . . under the filter[.]” TR 154 (Wood). This is known as the “NVIS lamp or the secondary lamp.” TR 155 (Wood). The other lamp in the back light assembly is “shaped somewhat like an M,” referred to as a “serpentine lamp,” that is used in daylight operation when high brightness is required. *Id.*; PTX 270.

Since January 2000, L-3 Communications has sold CMDUs to Lockheed Martin for use in the C-130J. *See* PTX 310 (7/27/05 Walsh Dep. at 324, 328). These CMDUs include the following components: [deleted]. *See* Int. Reply at 6 (citing JTX 79 (5/19/05 Walsh Dep. at 10); PTX 310 (7/27/05 Walsh Dep. at 325-27)); *see also* TR 376. L-3 Communications does not make these components, but purchases them as separate items and assembles them. *See* JTX 29 (Lamp Assembly), JTX 33 (Lamp Housing Assembly), JTX 40 (Display Module Assembly); PTX 310 (7/27/05 Walsh Dep. at 332, 358). For example, the C-130J CMDU display glass assembly is manufactured by OIS. *See* TR 194-95 (Wood).

A unique feature of the C-130J is that the flight instruments appear in graphic formats in a multi-function display on the MFD instead of mechanical flight instruments. *See* TR 813 (Byrd). Each C-130J has at least one, and up to four, CMDUs. *See* PTX 102A ¶ 3. In the CMDU, the [deleted] filter is [deleted] and is located between [deleted]. *See* TR 512-13 (Tannas).

[deleted]

L-3 Communications purchases the AMLCD as a separate glass-enclosed unit from [deleted] that is placed into the CMDU. *See* JTX 41, JTX 42, JTX 79 at 106; PTX 310 (7/27/05 Walsh Dep. at 360).

### **3. C-130H RDU - - Manufactured By L-3 Communications.**

The C-130H is a cargo plane, in which the Air Force has been installing a radar-display unit (“RDU”) also manufactured by L-3 Communications. *See* TR 813 (Byrd). To date, approximately thirty-six C-130Hs have been installed with RDUs. *See* PTX 103 ¶ 3. Each aircraft utilizes between one and two RDUs. *Id.* The RDUs have a full color AMLCD display that utilizes a backlight filter in day and night mode. *See* JTX 79 at 174-75. The components of the CMDU are the same as that in the RDU, including the [deleted] filter that splits the red color band in the same manner as the C-130J CMDU. *See* PTX 310 (7/27/05 Walsh Dep. at 361); *see also* TR 577-78 (Tannas).

C-130H pilots use F4949G AN/AVS-9 model NVGs manufactured by ITT Night Vision, previously Avionic Display Corporation. *See* JTX 79 at 174-75.

## **III. DISCUSSION.**

### **A. Jurisdiction.**

The United States Court of Federal Claims has jurisdiction to adjudicate claims that allege “an invention described in and covered by a patent of the United States is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same . . . [seeking] recovery of . . . reasonable and entire compensation for such use and manufacture.” 28 U.S.C. § 1498(a).

The Complaint and Amended Complaint in this action properly invoke the court's jurisdiction, pursuant to 28 U.S.C. § 1498(a).

**B. Standing.**

**1. Plaintiffs.**

Plaintiffs properly alleged at the inception of the lawsuit and when filing of the Amended Complaint on May 31, 2005 that Honeywell Intellectual Properties Inc. was the owner of the '269 patent application and '914 patent and Honeywell International, Inc. was an exclusive licensee of the '269 patent application and '914 patent. *See Honeywell*, 66 Fed. Cl. at 420. At the infringement trial, Honeywell Intellectual Properties established that it is the owner of the '914 patent and that Honeywell International, Inc. is the exclusive licensee of the '914 patent in the United States. *See* PTX 401; *see also* TR 92-103. Therefore, Plaintiffs have standing to assert claims of infringement in this case. *See Kalman v. Berlyn Corp.*, 914 F.2d 1473, 1481-82 (Fed. Cir. 1990).

**2. Intervenor.**

The court previously determined that Lockheed Martin has standing to intervene in this case as a matter of right, pursuant to RCFC 24(a). *See Honeywell*, 66 Fed. Cl. at 421.

**C. Burden Of Proof.**

The United States Court of Appeals for the Federal Circuit has instructed federal trial courts first to determine "the scope and meaning of the patent claims asserted[.]" *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (*en banc*) (citations omitted); *see also JWV Enterprises, Inc. v. Interact Accessories, Inc.*, 424 F.3d 1324, 1329 (Fed. Cir. 2005). On June 14, 2005, the court issued a determination of the claims that the parties asserted were at issue. *See Honeywell Int'l, Inc. v. United States*, 66 Fed. Cl. 400 (2005).

Next, federal trial courts are to compare each of the "properly construed" claims to the alleged infringing device. *See Cybor*, 138 F.3d at 1454 (*en banc*); *see also PC Connector Solutions, LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1362 (Fed. Cir. 2005); *SmithKline Beecham Corp. v. Apotex Corp.*, 403 F.3d 1331, 1337 (Fed. Cir. 2005). This comparison requires the court to determine whether each claim limitation is present in the accused device, or, in the alternative, to determine whether the accused device contains an "equivalent" for each of the "individual elements of the claim, not to the invention as a whole." *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997); *see also Dynacore Holdings Corp. v. U.S. Phillips Corp.*, 363 F.3d 1263, 1273 (Fed. Cir. 2004).

The burden of proof rests on the patentee to "show that the accused device meets each claim limitation, either literally or under the doctrine of equivalents." *Liquid Dynamics Corp. v. Vaughan Co.*, 355 F.3d 1361, 1367 (Fed. Cir. 2004) (citing *Deering Precision Instruments, L.L.C. v. Vector Distrib. Sys., Inc.*, 347 F.3d 1314, 1324 (Fed. Cir. 2003)); *see also Pennwalt Corp. v. Durand-*

*Wayland, Inc.*, 833 F.2d 931, 935-36 (Fed. Cir. 1987) (*en banc*). Under either theory, infringement must be established by a preponderance of the evidence. See *Centricut, LLC v. Esab Group, Inc.*, 390 F.3d 1361, 1367 (Fed. Cir. 2004), *cert. denied*, 126 S.Ct. 337 (2005).

#### **D. Controlling Precedent Concerning Literal Infringement.**

In *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 607 (1950), the United States Supreme Court held: “In determining whether an accused device . . . infringes a valid patent, resort must be had in the first instance to the words of the claim. If accused matter falls clearly within the claim, infringement is made out and that is the end of it.” The United States Court of Appeals for the Federal Circuit has emphasized that the “falls clearly” required that “every limitation of a claim [must] be met” to establish literal infringement. See *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1389 (Fed. Cir. 1992) (emphasis in original); see also *Research Plastics, Inc. v. Federal Packaging Corp.*, 421 F.3d 1290, 1297 (Fed. Cir. 2005) (“Literal infringement requires that the accused device embody each of the limitations of the asserted claim.”).

#### **E. The Court’s Determination Of Plaintiffs’ Claims Of Literal Infringement.**

The Government and Lockheed deny Honeywell’s assertion that the following limitations are present in each of the designated systems: the “notch filter” limitation in Claim 1; the “predetermined red color band” limitation in Claim 1; the “plurality of filters” limitation in Claim 2; “substantially blocking” limitation in Claim 2; and “the narrowband of the red color band is substantially five to twenty nanometers wide” in Claim 3.

The court’s adjudication of Honeywell’s assertion as to literal infringement of Claims 1, 2 and 3 follows.

##### **1. As To Claim 1 Of The ‘914 Patent.**

In order to establish literal infringement as to Claim 1 of the ‘914 patent in this case, Honeywell must establish by a preponderance of the evidence that the two contested limitations, *i.e.*, “notch filter” and “predetermined red color band” are present in the designated displays.<sup>12</sup>

##### **a. The “Notch Filter” Limitation.**

Claim 1 states that “a first optical filter that filters light from the local color display . . . is a notch filter.” JTX 1 (‘914 patent, col. 6, ll. 1-6).

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<sup>12</sup> Honeywell argued that the Preamble to Claim 1 is literally infringed by each of the designated systems. See Pl. PT Mem. at 28-32. The Government and Lockheed Martin did not contest this allegation.

**i. The Court's Construction Of "Notch Filter."**

The court construed "notch filter," as it appears in Claim 1, as follows:

[A]n optical filter that has the capacity both to pass and substantially block light and may be a single-notch filter or a multi-notch filter.

*Honeywell*, 66 Fed. Cl. at 459.

Based on new evidence at the infringement hearing, the parties stipulated and the court entered an August 4, 2005 order re-construing "notch filter" in Claim 1 to mean:

An optical filter that has the capacity to pass in a narrowband (and substantially block in immediately adjacent bands) or has the capacity to substantially block in a narrowband (and pass in immediately adjacent bands) . . . and may be a single-notch or a multi-notch filter.

*Honeywell Int'l, Inc. v. United States*, No. 02-1909C (Fed. Cl. Aug. 4, 2005) (Order); *see also* TR 598-611; *Pfizer, Inc. v. TEVA Pharmaceuticals USA, Inc.*, 429 F.3d 1364, 1377 (Fed. Cir. 2005) ("Indeed, a conclusion of law such as claim construction is subject to change upon the development of the record[.]"); *see also* TR 862 (Task testifying that "in the original construction of notch filter . . . [a]ny filter and every filter that I know of that has been built or used to date satisfies that, that it passes and blocks light.").

In addition, the court construed "optical filter," when used as a noun, to mean "*a device that selectively passes and blocks electromagnetic radiation*" and "filters" (plural), when used as a noun, to mean "two or more filters." *Honeywell*, 68 Fed. Cl. at 448.

**ii. The Plaintiffs' Contention.**

Honeywell contended that a preponderance of the evidence establishes that each of the designated displays has a "first optical filter," that is a "notch filter," as stated in the August 4, 2005 Order. *See* Pl. PT Mem. at 34.

At the infringement hearing, Honeywell argued that the "notch filter" was not one physical entity, but the lamp filter combined with all the color pixel filters:

HONEYWELL'S COUNSEL: The notch filter . . . is a combination filter of these two filters here. They together provide the function of the notch filter, because they allow green notches, blue notches, and the red notch to pass through.

THE COURT: The entire array of color pixel filters are what you're saying is the notch filter?

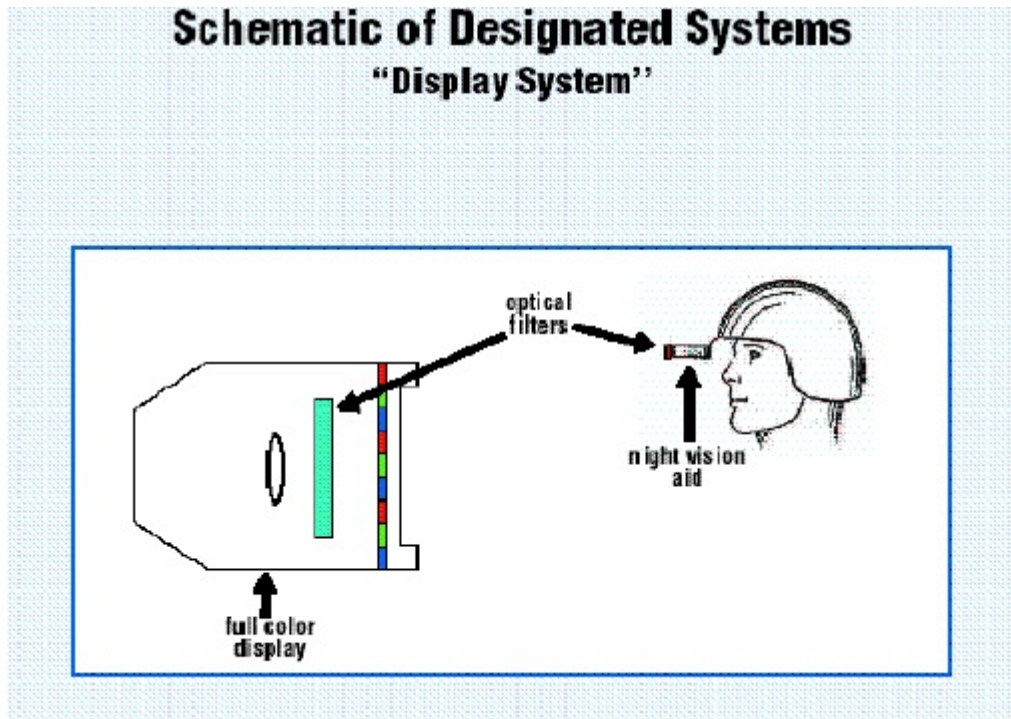


HONEYWELL'S COUNSEL: Yes, that combined with the lamp filter.

TR 23-25.

That argument was abandoned, because Honeywell's expert, Mr. Tannas, testified that the lamp filter and only the red pixel filters in combination or working together accomplished the function of a "notch filter." PTX 446 (Tannas Direct) ¶ 111 (CMFD), ¶ 129 (RDU), ¶ 141 (CMDU).

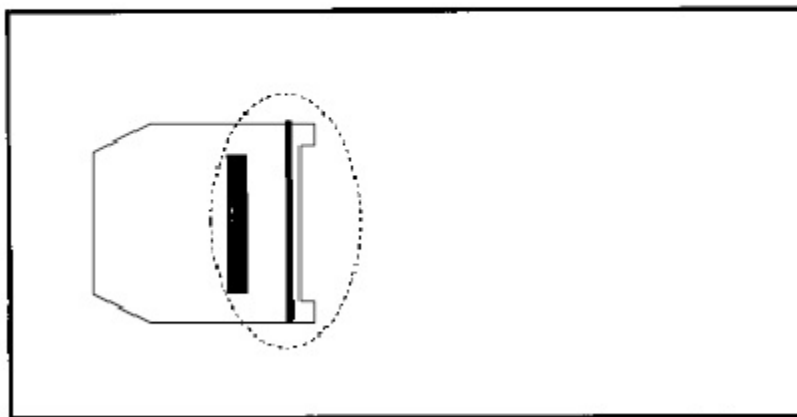
To understand the significance of this perspective of the "notch filter," it is helpful to review several demonstrative exhibits prepared by Mr. Tannas and used at the infringement hearing. First is a "Schematic of Designated Systems 'Display System.'" PTX 446 (Tannas Direct) ¶ 76 (referencing PTX 417). This exhibit depicts the display system in the designated systems, as a full color display and a night vision aid, both of which utilize optical filters.



PTX 417.

To demonstrate the presence of a "notch filter" in the CMFD, Mr. Tannas prepared the following exhibit:

## Schematic of Designated Systems “Notch Filter”



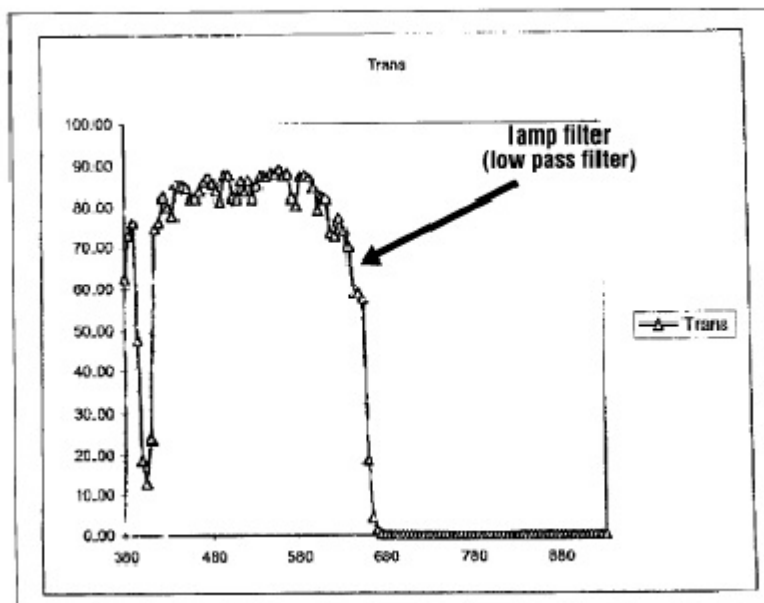
PTX 420

PTX 420 (enhanced).

Mr. Tannas testified that the “combination of the lamp filter and the red pixel filter in the CMFD creates a filter with properties that are cumulative of the two filters.” PTX 446 (Tannas Direct) ¶ 115; *see also* TR 487 (Tannas testified that a combination of properties from AMLCD and backlight filter satisfy Claim 1 of ‘914 patent: “Yes. The way they’re arranged functionally, they would act like they were together.”); *see also id.* (same regarding Claim 2).

The next Tannas schematic shows that when the lamp filter is operational, wavelengths of light between 380 nm and 660 nm pass through, but wavelengths of light above the 660 nm range are blocked. *See* PTX 446 (Tannas Direct) ¶ 115 (referencing PTX 422). Mr. Tannas, however, conceded that the lamp filter alone “is not a notch filter.” TR 696 (Tannas).

## F-16/CMFD Lamp Filter Transmission Spectrum



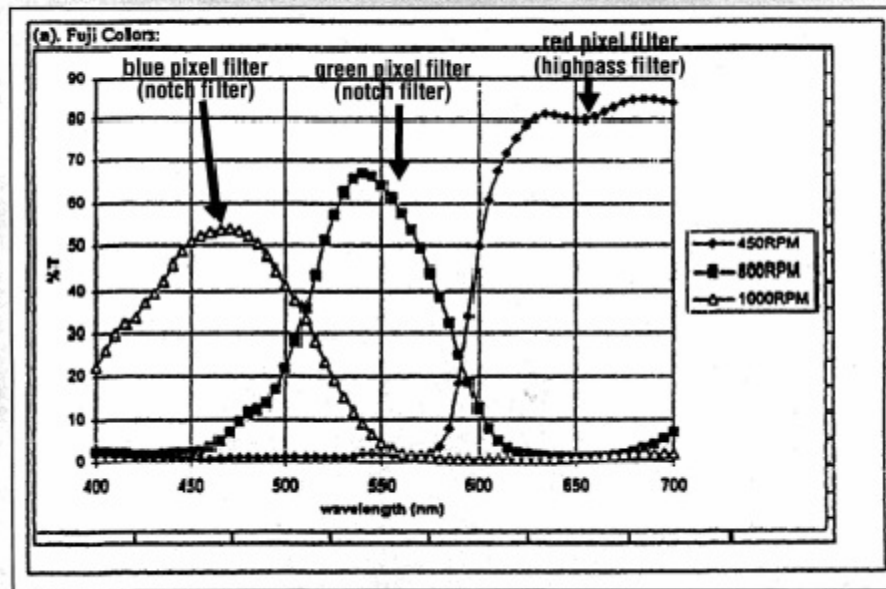
PTX 422

Source: PTX 255 at H59237

PTX 422; *see also* TR 695-96 (Tannas); TR 181-83 (Wood testified that: “light [at wavelengths below 660 nm] is generally passed through the filter [used to cover the night mode lamp in the CMFD] and is available for use by the liquid crystal display.”).

The red pixel filters are high pass filters that pass wavelengths of light above 600 nm, but substantially block wavelengths below 600 nm. *See* PTX 446 (Tannas Direct) ¶ 115 (referencing PTX 423); *see also* TR 695-96 (Tannas); TR 200-01 (Wood testified that the CMFD red pixel filters pass light at “roughly” 580 nm) .

## Color Pixel Filter Transmission Spectra

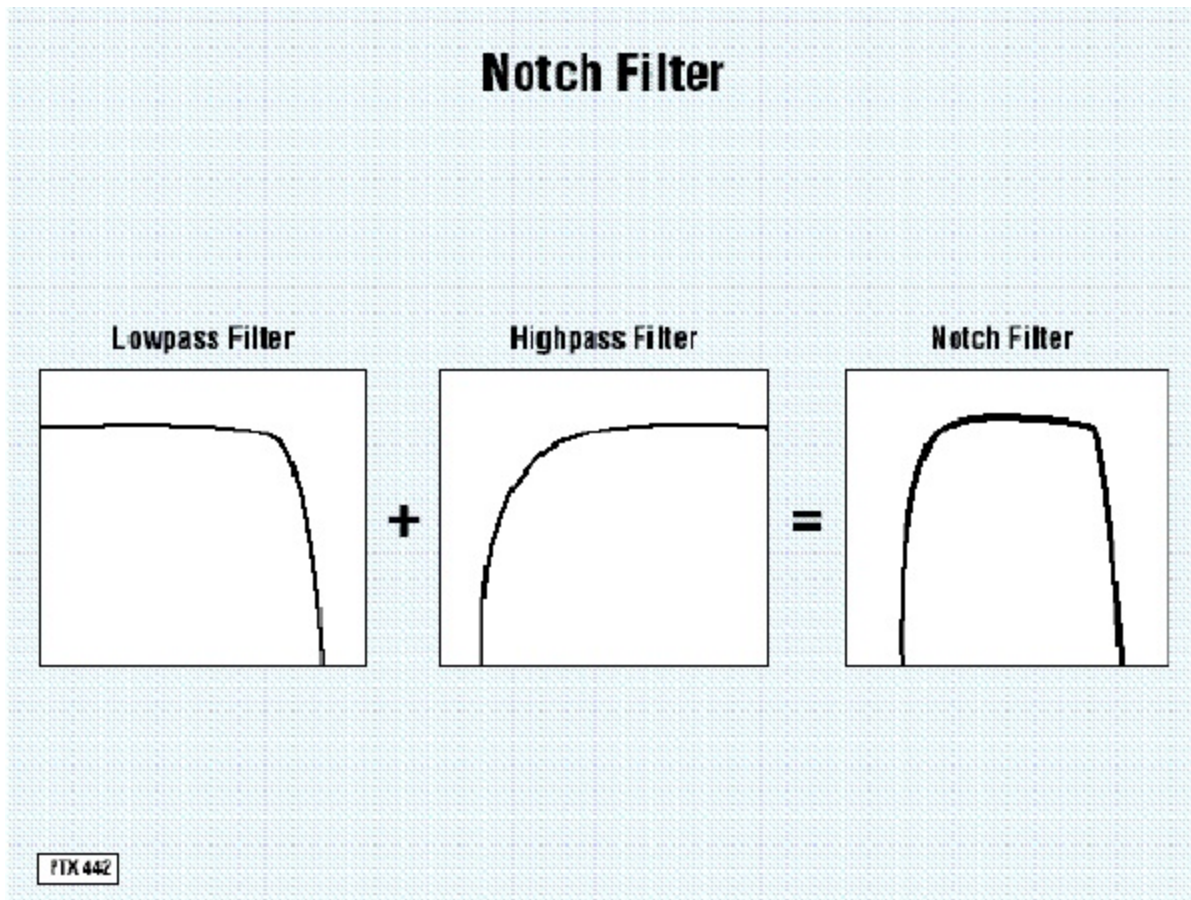


PTX 423

Sources: JTX 15 at H57611

PTX 423.

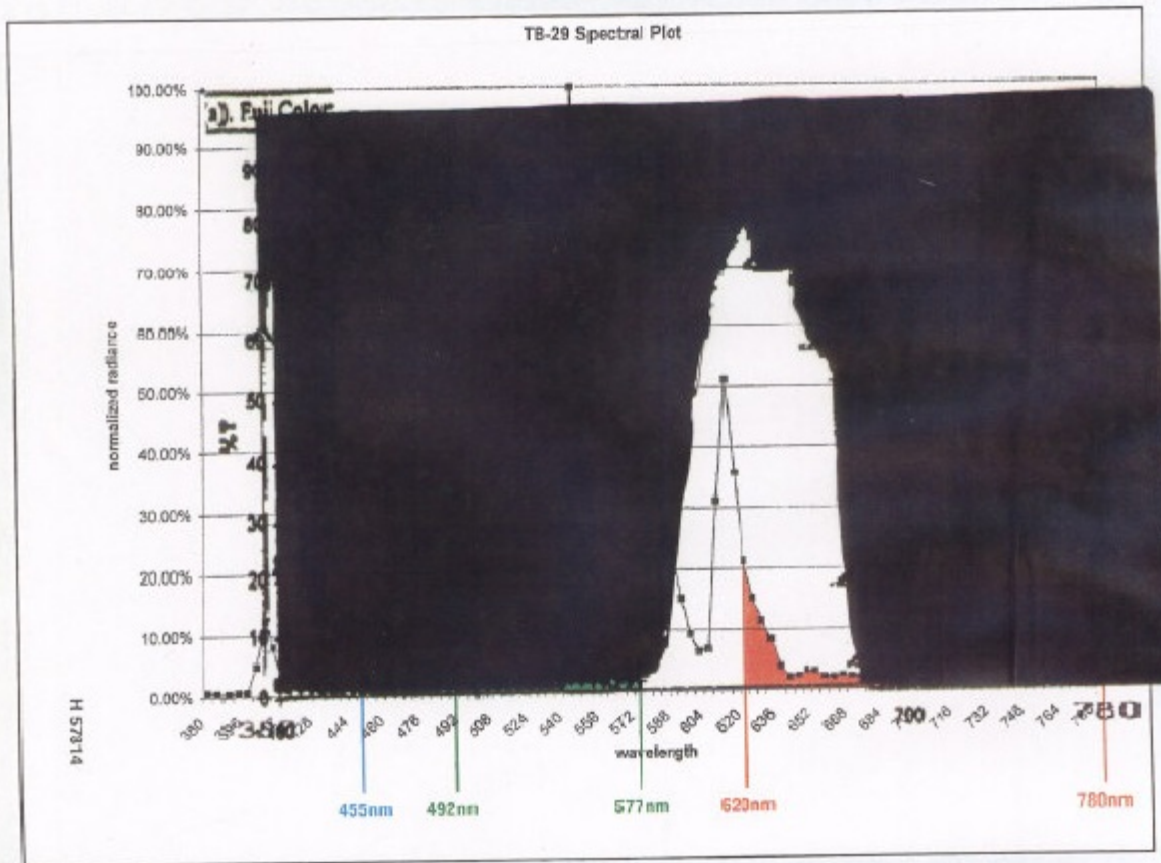
When the lamp filter and red pixel filters are combined, Mr. Tannas explained that a notch filter results. See PTX 446 (Tannas Direct) ¶ 116. To illustrate this point, Mr. Tannas prepared the following schematic to show how the combination of a low pass filter with a high pass filter yields a “notch filter.”



PTX 442.

At the infringement hearing, Mr. Tannas demonstrated this by overlaying PTX 447 and PTX 448 to produce PTX 449. TR 697, 700.

## F-16/CMFD TB-29 Lamp Spectrum



PTX 449.

As to the RDU, Mr. Tannas also testified that the “first optical filter” is “the combination of the lamp filter and an array of color pixel filters in the LCD panel.” PTX 446 (Tannas Direct) ¶ 130 (citing JTX 25, JTX 27, JTX 79 at 61-63, 85-95, 245-46; PTX 222). Mr. Tannas stated that this combination “selectively allows light to pass and be blocked. The starting point for filtering occurs at the filters.” *Id.* ¶ 130; *see also id.* ¶ 131 (“The combination of the lamp filter and array of color pixel filters in the RDU is a notch filter[.]”) (citing JTX 4, JTX 25; PTX 103, PTX 222, PTX 223, PTX 420).

Mr. Tannas likewise testified that in the CMDU the “first optical filter is the combination of the lamp filter and an array of color pixel filters in the LCD panel.” *Id.* ¶ 142 (citing JTX 39; PTX 194, PTX 299). Mr. Tannas concluded that this combination “selective[ly] allows light to pass and be blocked. The starting point for filtering occurs at the filters.” *Id.* ¶ 142; *see also id.* ¶ 143 (“The combination of the lamp filter and array of color pixel filters in the CMDU is a notch filter[.]”) (citing JTX 19 at L-3001120-22, JTX 39; PTX 6, PTX 102, PTX 194, PTX 420).

During cross-examination, Mr. Tannas admitted, however, that he did not have an opportunity to inspect a CMDU, but did see “pictures . . . diagrams and drawings of “various aspects[.]” TR 373; *see also* TR 374-77, 400, 493-95 (Tannas).<sup>13</sup>

### **iii. The Government’s Response.**

The Government responded that Honeywell failed to present “a convincing case” that any of the accused displays contains a “notch filter.” Gov’t PT Mem. at 20; *see also id.* at 21 (the evidence presented “clearly shows that *no device* within the accused displays ‘passes in a narrowband (and substantially blocks in immediately adjacent bands),’ or ‘substantially blocks in a narrowband (and passes in immediately adjacent bands).’” (emphasis added)). As the Government argued at the opening of the infringement hearing:

[M]anufacturers have applied what’s called a lamp filter to achieve NVG compatibility . . . [I]t’s a low pass filter . . . . You notice that it’s not a notch filter. And your Honor, the evidence will show that the industry does not use notch filters to achieve NVG compatibilities on displays. It’s just not done . . . [T]he industry developed separate notch filters, they developed low pass filters . . . . We believe that the evidence will show that the only way Honeywell is going to be able . . . to show those two types of filters is to sort of mush together the filters that are actually in the displays. . . . [A]s I said, there’s not a notch filter there.

TR 46-50.

#### **a.) Testimony Of Mr. Ted Wood, A Senior Fellow Engineer At Honeywell.**

The Government argued that Mr. Wood’s testimony did not support Honeywell’s contention that the F-16 CMFD included a “notch filter,” as stipulated by the parties. *See* Gov’t PT Mem. at 21-22. Although Mr. Wood testified about his work as lead engineer designing the AMLCD for the F-16, he did not testify that the F-16 CMFD utilized either a notch filter or a narrow band filter. *See* TR 120-366.

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<sup>13</sup> The issue of making the accused devices available to Honeywell for inspection was a major focus of: the July 16, 2004 conference (7/16/04 TR 5-33); the July 23, 2004 conference (7/23/04 TR 9-10) (the Government identified several F-16s located at Langley Air Force Base in Virginia available for inspection); the July 30, 2004 conference (7/30/04 TR 10-11) (assuming Honeywell submitted a letter for clearance, the Government anticipated inspection could be in the mid-to-late August 2004 time frame); and the August 5, 2004 conference (8/5/04 TR 9-11) (confirming that Honeywell did not send a letter requesting an inspection until August 4, 2004).

On October 13, 2004, Honeywell substituted counsel of record and the issue of inspecting the designated displays was not further pursued with the court.



THE COURT: What do you consider a notch filter to be? Can you describe to me what a notch filter is.

MR. WOOD: In my particular use of notch filters, it's been long ago in the CRT days. We would put what we would call contrast enhancement filters on CRTs, and they would block certain wavelengths of light while passing others.

THE COURT: And why haven't you used a notch filter recently in your work?

MR. WOOD: I actually have. But that's long ago when I used notch filters. There are particular types of glass that actually have notch characteristics where they specifically reject certain wavelengths of light or absorb them and then pass them -- other wavelengths of light. More substantially, I tend to use terms like band pass, low pass, high pass.

TR 204-05. In fact, Mr. Wood was more comfortable with defining a notch filter as a narrow band filter. *See* TR 300-01 (Wood); *see also* TR 205-06 (argument by Lockheed Martin's counsel and Government's counsel that a notch filter and a bandpass filter are different devices) (citing JTX 1 ('914 patent, col. 4, ll. 66-67)).

**b.) Testimony Of Mr. Kevin Walsh, Optics Design Staff Engineer At L-3 Communications.**

Mr. Walsh, an Optics Design Staff Engineer at L-3 Communications, testified that a “notch filter” is . . . a filter that has relatively high transmission for a certain wavelength region and then a relatively low transmission for a while, fairly narrow in comparison to the overall performance, and then the transmission goes back up again.” PTX 310 (7/27/05 Walsh Dep. at 352). The [deleted] filter in the C-130J CMDU provided NVG compatibility, but was not a “notch filter.” *Id.* at 352-53.

**c.) Expert Testimony Of Dr. Harry L. Task, Former Senior Scientist For Human Systems Interface At The United States Air Force Research Laboratory.**

Initially, the Government's expert, Dr. Task, did not render an opinion about whether any of the “designated systems” included a “notch filter.” *See* DE 202. Subsequently, the construction of “notch filter” was amended and stipulated to by the parties during the infringement hearing. *See Honeywell Int'l, Inc. v. United States*, No. 02-1909C (Fed. Cl. Aug. 4, 2005) (Order); *see also* TR 600-15. Thereafter, Dr. Task testified on cross-examination that “under Claim 1, . . . the first optical filter is not a notch filter . . . the first optical filter is the lamp filter in each of the [designated] displays.” TR 861.

HONEYWELL'S COUNSEL: Is there any detailed basis for it, that you could provide to us, for your reasoning as to why the first optical filter is simply the lamp filter?



DR. TASK: Yes, and I think some of that actually is covered in my direct testimony, although not in reference to a notch, in the original construction of notch filter, saying it was a filter that passes and blocks light. *Any filter and every filter that I know of that has been built or used to-date satisfies that, that it passes and blocks light.* So I did not worry about notch filter as being anything that would differentiate the designated displays from ones that might infringe to ones that might not infringe.

TR 862-63 (emphasis added).

\* \* \*

GOVERNMENT'S COUNSEL: Do you disagree with Mr. Tannas that the displays have a notch filter that's required by Claim 1 of the patent?

DR. TASK: Yes, I do[.]

TR 1016.

\* \* \*

GOVERNMENT'S COUNSEL: Dr. Task . . . do you agree with . . . Mr. Tannas, that you could combine the lamp filter and the [red] pixel filter in the way that he does?

DR. TASK: No, I do not. There's basically two arguments that I have, one which was in my report which relates to a business of using the colored display, the color pixels in the liquid color display as part of the components that would make the notch filter. And from that standpoint, if you look at the testimony we've had all last week, the *color pixels are inside something called the liquid crystal display or the LCD glass, and they are laminated inside there.* They're not --

THE COURT: They stay there.

DR. TASK: *They stay there.* If I asked you to hand me the red color pixels, for example --

THE COURT: You'd have to get a hammer and break it out.

DR. TASK: You'd have to break it apart. So that is one solid piece. In fact, it's kind of interesting that the abbreviation is LCD, liquid crystal display, but it could also be local color display, except for the lamp source. You have to have the lamp source as well. So in that sense, if I have a, [sic] to use this notch filter in conjunction with the local color display, I first of all have to have a local color display[.]

TR 1018-19 (emphasis added).

\* \* \*

GOVERNMENT'S COUNSEL: Dr. Task, do you recall Mr. Tannas' testimony that you could combine the lamp filter in with the primary red filter of the display shown in [PTX] 448?

DR. TASK: Yes, and that's another one that I have a problem with, and it's something where *these are two totally different components*, the red color pixels are an integral part of a local color display. They're in-between those sandwiched pieces of glass, and in fact, last week, when we had Mr. Wood testify as to drawing these filters and he was asked to draw the red color filter band, which he did, and he was asked to label that, he did. He called it the red color pixel filter transmission. He was asked to graph the lamp filter transmission, which he did. He was asked to label that, and he labeled that the lamp filter transmission. And then he was asked to plot the distribution that you would get when you put those two together, which he also did. He was asked to label that, but he didn't have a label for that as a separate thing, such as an NVIS filter or a color pixel filter. He had to label it as a combination of the color pixel filter and the lamp filter. *So these things by one skilled in the art are thought of, the engineers, are thought of by two different things. There was nothing that referred to that notch filter in any of the things that I saw as the notch filter. It was always those two components.* Typically, if you're going to have a filter which is composed of component parts, there'll be a name for that resulting filter, something that's descriptive, so engineers when they're talking to each other know what it is they're talking about[.]

THE COURT: We talked about notch filter, . . . in the claim construction, as being a generic term.

DR. TASK: Yes.

THE COURT: Okay.

DR. TASK: As the way it would be used by one skilled in the art, we don't know what that - - I mean, it doesn't have a name as the other components, the other pieces of hardware do have a name to them.

GOVERNMENT'S COUNSEL: Dr. Task, I'm going to hold up [PTX] 447, which is the lamp filter.

DR. TASK: Yes.

GOVERNMENT'S COUNSEL: And let's say this transparency actually had the characteristics that is charted on here, so this would be the lamp filter?

DR. TASK: Yes.

GOVERNMENT’S COUNSEL: Okay. And then [PTX] 448, you have the primary red pixel filter, and let’s say this transparency had the characteristics that are drafted on here?

DR. TASK: Yes.

GOVERNMENT’S COUNSEL: Now, could you laminate these two pieces of filter together?

DR. TASK: Yes, you could.

GOVERNMENT’S COUNSEL: And would you call that a filter?

DR. TASK: Yes, that results, I would call a filter, once you’ve laminated and put together or positioned them like that, yes.

GOVERNMENT’S COUNSEL: Now, if I were to place - -

THE COURT: It’s a notch filter?

DR. TASK: I would also call that a notch filter. . . . It could be called a notch filter.

GOVERNMENT’S COUNSEL: Now, if you were to place this piece of lamp filter on a lamp in a lamp subassembly and you were to place a primary red filter in an LCD assembly that was separate, would you consider those to be a filter?

DR. TASK: The way those are employed in each of the designated devices, I would not consider them a filter together.

THE COURT: Because they’re in other, they’re housed in other component parts which have their own function?

DR. TASK: That’s correct.

TR 1028-31 (emphasis added).

#### **iv. The Intervenor’s Response.**

Lockheed Martin responded that the CMDU does not literally infringe Claim 1, because it does not include “a first optical filter that . . . is a notch filter.” Int. Reply at 27. In the alternative, even if the CMDU includes a “first optical filter” that is a “notch filter,” Lockheed Martin argued that the CMDU does not include a “local color display.” *Id.*

Regarding the latter, Lockheed Martin argued that neither the night vision aid nor “local color display” are “optical filters” of the “display system,” as construed by the court. *Id.* (citing *Honeywell*, 66 Fed. Cl. at 437). Since the court construed “display system” to mean “[a] system comprised of optical filters,” the “*optical filters*” are “distinct claim limitations that *have been construed as being in addition to and not part of . . . the local color display of the CMDU.*” Int. Reply at 27 (emphasis added). Therefore, “local color display” is “[a] device that may be used *together or in combination with* optical filters.” *Id.* (citing *Honeywell*, 66 Fed. Cl. at 437) (emphasis added).

#### **v. The Court’s Determination Regarding Infringement.**

Honeywell insists that it is proper to combine the lamp filter with the red pixel filter to create a “notch filter.” See Pl. PT Mem. at 34-48. There is nothing in the parties’ stipulation of “optical filter” that precludes two filters from being combined to achieve a separate filter. See *Honeywell*, 66 Fed. Cl. at 448. In response, the Government argues that Honeywell’s utilization of two separate elements to meet or achieve a claim limitation is an inappropriate use of “double inclusion,” a doctrine typically that arises in a challenge for lack of definiteness under 35 U.S.C. § 112. See Gov’t PT Mem. at 29. The court understands that the author of a patent is obligated to “[s]tate the minimum number of similar [limitations] needed where more than one is necessary to the claim. If any number more than one will do, use the phrase ‘a plurality.’” *Landis on Mechanics of Patent Claim Drafting* (5th ed., incorporating Release No. 2, Nov. 2005) § 3:9 at 3-37. If the same limitation is included “twice in a claim under two different terms, this is recognized as an error known as ‘double inclusion.’” *Id.* The problem with “double inclusion” is that the duplicative use of the same limitation can render the scope of the patent unclear to one skilled in the art. *Id.* (citing *In Re Kelly*, 305 F.2d 909, 916 (C.C.P.A. 1962)).<sup>14</sup>

In this case, Honeywell relies on two separate elements in the designated displays, the “lamp filter” and “red pixel filters,” to establish literal infringement of the “notch filter” limitation in Claim

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<sup>14</sup> The court’s independent research has not revealed a case where the United States Court of Appeals for the Federal Circuit has considered the “double inclusion” doctrine in the context of a determination of infringement. A predecessor court in *In Re Kelly*, 305 F.2d 909 (C.C.P.A. 1962), in an appeal from an interference proceeding held that “[a]utomatic reliance upon a ‘rule against double inclusion’ will lead to as many unreasonable interpretations as will automatic reliance upon a ‘rule allowing double inclusion.’ The governing consideration is not double inclusion, but rather is what is a reasonable construction of the language of the claims.” *Id.* at 915. Regarding the reasonableness inquiry, “where there is no ambiguity in the language of the claims, they should be carefully analyzed to see if they can be reasonably found to be supported by the disclosed structure. *We wish to emphasize that this case is not intended to support a rule that all elements which perform separate functions may be recited any number of times in the claims . . . . Each claim in each case must be interpreted as broadly as its language will reasonably permit and each interpretation will depend upon the individual facts of each case. . . . [The governing consideration is not double inclusion, but rather is what is a reasonable construction of the language of the claims.] Id.*

1. This is not a situation, however, where the same limitation is described in the language of a claim using two different terms. Therefore, the court is not persuaded that the doctrine of “double inclusion” is applicable, or even relevant in this case.

Nevertheless, the court has determined that combining the lamp filter with the red pixel filters to achieve a “notch filter” is inconsistent with the court’s prior claim construction. The parties stipulated that a “notch filter” is an “optical filter.” *Honeywell*, 66 Fed. Cl. at 448. The parties also stipulated that when the terms “optical filter” and “filter,” are used as nouns in the claims of the ‘914 patent, they mean “*a device that selectively passes and blocks electromagnetic radiation.*” *Id.* (emphasis added). At the infringement hearing, the court challenged Mr. Tannas’ opinion that a “notch filter” could be achieved by combining the lamp filter and a red pixel filter and thereby become the first “optical filter” in Claim 1. In response, Mr. Tannas testified that the combined lamp filter and red pixel filters in the designated displays created a “notch filter” that was not a “device,” but instead the location where the *function* of filtering first takes place:

MR. TANNAS: *The first function is in the display, and it happens to be made up of the lamp filter and the display filters, and the second filter is in the night-vision goggle, and it happens to be made up by the filter that’s added, but I also know that internal to the night-vision goggle, there are three or four other filters inside that are all necessary to accomplish the task. So the first, there is the function, it’s the total package of filters, not the first piece of glass, but the first filtering is done at the display, and the second filtering is done at the night-vision goggle. And I think the key that exudes that is in B. They start out by saying, ‘wherein the second filter,’ and following your reasoning, the second filter would be the display filters.*

THE COURT: The emphasis, our difference is you’re reading from the, to the first, in 1(a), to the first comma, the first optical filter that filters light from the local color display, and in your reading, I heard what you’re saying, is that first optical filter is the lamp filter and the pixel filters because they are *filtering* at the color display.

MR. TANNAS: Yes, the first task is to filter at the . . . [a]t the box. . . . So *my reading of that is that that first filter is functional, not hardware*, and to support that argument, *the second filter is also functional*.

TR 708-10 (emphasis added).

\* \* \*

MR. TANNAS: So the first group is, in this particular case [in Claim 1], as opposed to Claim 2, *the first group is that set of filters at the display*. The second group is that set of filters at the night-vision goggle. And the writers of the patent, when they say a second optical filter that filters light at the night-vision goggle, wherein said second optical filter, well, if it only describes a second optical filter at the night-vision goggle, where’s the first optical filter of the night-vision goggle? It’s missing, unless it’s read as a functional thing.

THE COURT: You don't count the lamp filter in the way you're construing this though because you begin with the notch filter.

MR. TANNAS: No. In 1(a)? *I begin there with the total task of filtering.*

TR 713 (emphasis added).

\* \* \*

THE COURT: *The way you're reading it is that the first optical filter has to be the notch filter. . . . When it becomes a notch.*

MR. TANNAS: that the first filter, that this patent is claiming that as its teaching, that the first filter for determining the color band, well, for determining the predetermined red color band, see, the word "notch" –

THE COURT: I see how you're reading it, is you're saying, your construction is that the first optical filter equals the notch filter.

MR. TANNAS: Yes.

THE COURT: You can have 150,000 filters before.

MR. TANNAS: There's several pieces in –

THE COURT: Doesn't make any difference how many there were or whatever because that doesn't, you don't get to the first filter until you get to the notch filter, that's what your argument is.

MR. TANNAS: The first filter is everything inside the display.

THE COURT: No. I think what you're saying is the first optical filter is when you get to the notching, when you get to the notch filter is the first filter. Wherein said first optical filter is the notch filter, is a notch filter.

MR. TANNAS: Yes[.]

TR 714-15 (emphasis added); *see also id.* at 487-93, 719.

The "devices" that selectively pass and block electromagnetic radiation in all three of the designated displays, however, are the lamp filter and the AMLCDs, containing color pixel filters. *See* PTX 446 (Tannas Direct) ¶¶ 64, 65. As Mr. Tannas testified on cross-examination, the lamp filter in the CMDU was not a "notch filter." *See* TR 484-85; TR 731 (same re: CMFD); *see also* PTX 10 at 325 (same re: CMDU). Likewise, Mr. Tannas testified that the red subpixel filter contained in the AMLCD is not a notch filter. *See* TR 696 ("And then we're going to put on the second filter that the

light passes through, which is not a notch filter either, it's a high pass.”). The court’s critique of Mr. Tannas’ analysis is that he ignored the parties’ stipulations of “optical filter” and “notch filter,” to achieve an objective. *See* TR 722 (The court: “[T]he parties agree[d] to the term ‘optical filter,’ when used as a noun means ‘a device.’” (internal quotations added)).

For these reasons, the court has determined that Honeywell did not establish by a preponderance of the evidence that each of the designated systems includes a first “optical filter” that also is a “notch filter,” as stipulated by the parties and construed by the court to be a “device,” not a “function.”

**b. The “Predetermined Red Color Band” Limitation.**

**i. The Court’s Construction Of The “Predetermined Red Color Band.”**

The court construed the “red color band” claim as follows:

Since . . . the prosecution history of the ‘914 patent recognized the lower end of a red color band is 620 nm, rather than 622 nm, the court construes 620 nm as the lower end wavelength boundary of the ‘red color band.’ . . . [T]he court construes ‘red color band’ as having an upper end range of 780 nm.

*Honeywell*, 66 Fed. Cl. at 471.

The parties stipulated that the “‘predetermined red color band,’ as used in the claims of the ‘914 patent, means ‘a specific range of wavelengths within the red color band.’” *Id.* at 472.

**ii. The Plaintiffs’ Contention.**

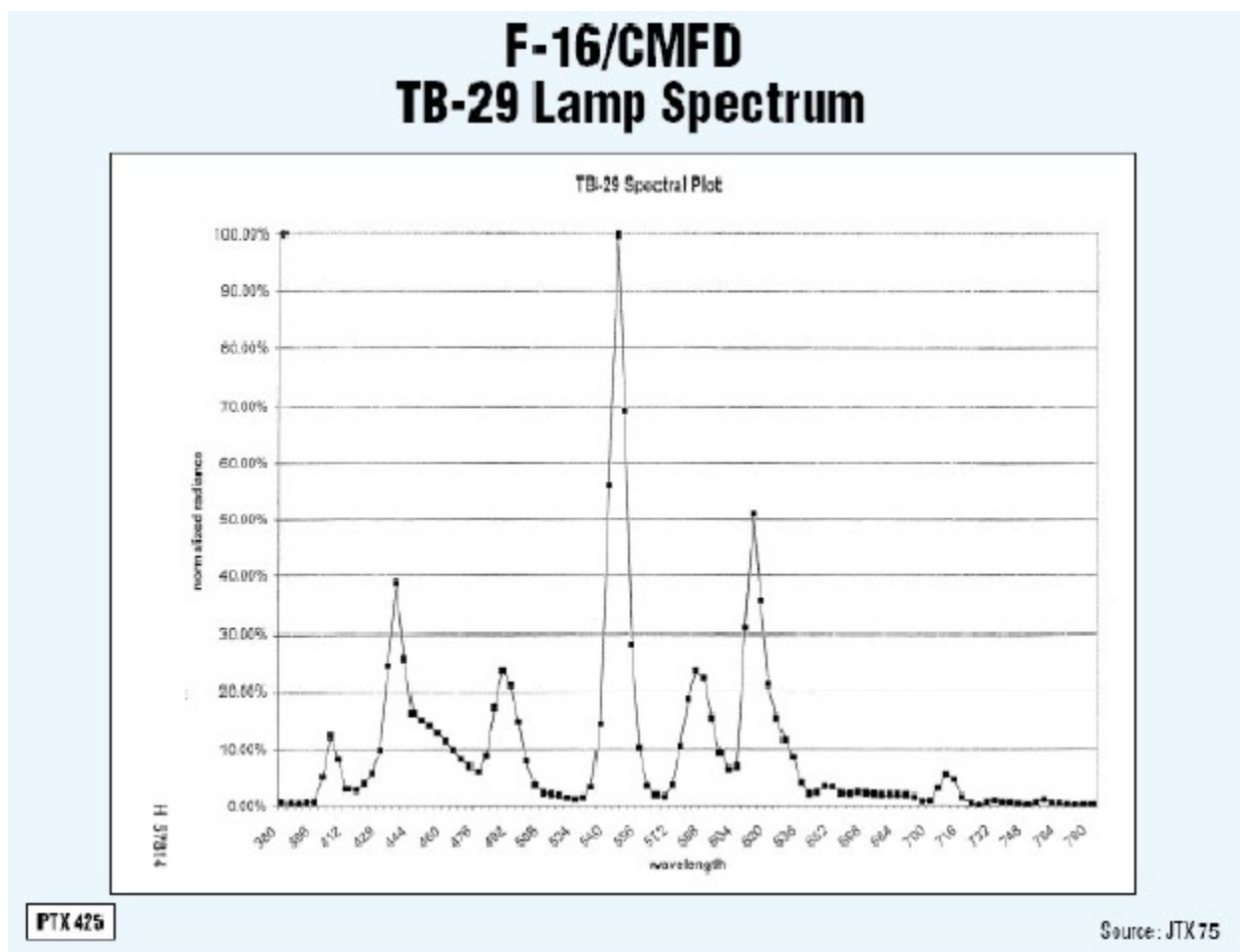
Honeywell contended that a preponderance of the evidence established “in each of the designated displays, that the first optical filter (*i.e.*, a combination of the lamp filter and the red pixel filter) ‘passes light comprising predetermined color bands including a predetermined red color band.’” Pl. PT Mem. at 50 (citing PTX 446 (Tannas Direct) ¶¶ 117, 133, 147)). Again, Honeywell relied on the expert testimony of Mr. Tannas and demonstrative exhibits that he prepared. *Id.*

Mr. Tannas’ analysis begins with the assumption that the lamp or “local source of light” in each of the designated displays emits a broad spectrum of light. *See* PTX 446 (Tannas Direct) ¶¶ 118-19 (citing PTX 425 (showing the emission spectrum for the TB-29 lamp on the F-16 CMFD)).<sup>15</sup>

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<sup>15</sup> Mr. Wood testified that a “[s]pectral emission . . . [looks] at the light or energy . . . being emitted from a surface.” A “spectral energy distribution” is “energy that’s being emitted from the surface of the lamp.” TR 157.

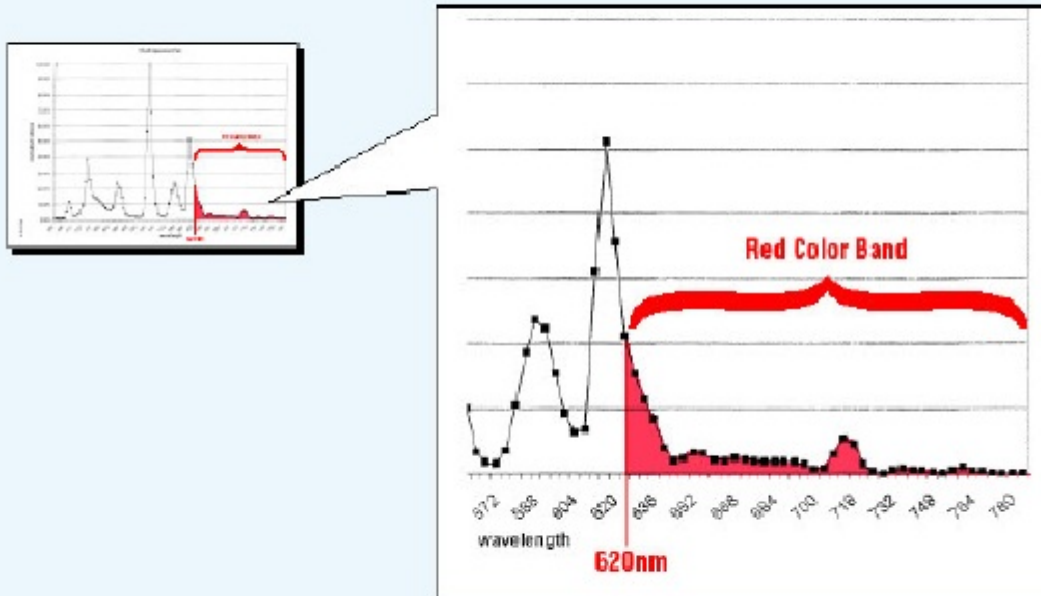
According to Mr. Tannas, the TB-29 lamp emits a “red color band,” as defined by the court. See PTX 446 (Tannas Direct) ¶ 119; see also TR 159 (Wood testifying that JTX 49 “is a normalized plot of the spectral emissions of [a] lamp . . . identified as TB-29 . . . [I]n this particular case spectral emissions were measured from the lamp from 380 to 780 nanometers.”).



PTX 425.



## F-16/CMFD Red Color Band



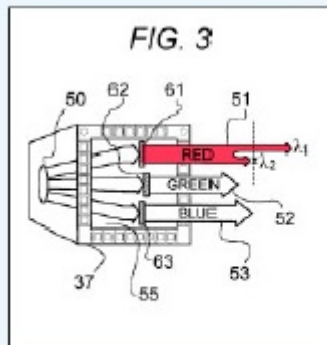
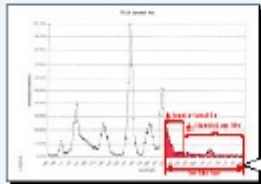
PTX 427

Source: JTX 75

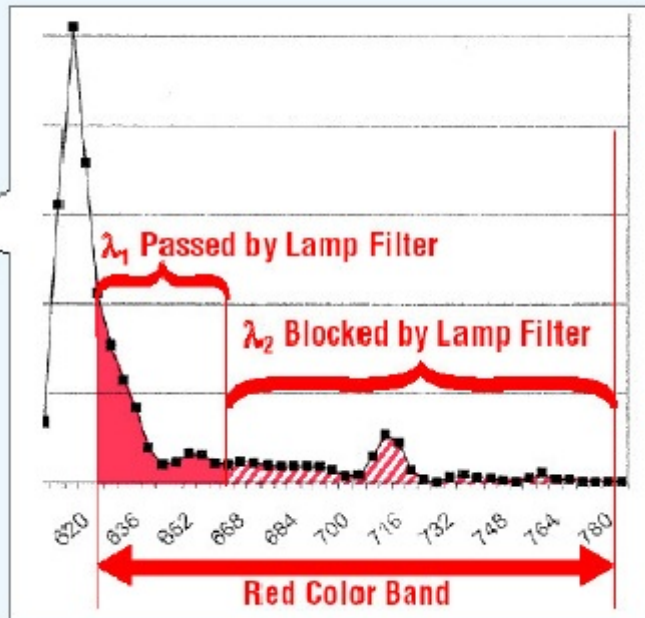
PTX 427; see also TR 739-40.

The lamp filter splits the red color band into two sub-bands,  $\lambda_1$  and  $\lambda_2$  -  $\lambda_1$  is passed by the lamp filter, but  $\lambda_2$  is blocked. See PTX 446 (Tannas Direct) ¶ 120 (referencing PTX 428). A predetermined or narrowband  $\lambda$  of the red color band is emitted by the display. *Id.*

## F-16/CMFD “Splitting” of Red Color Band into $\lambda_1$ and $\lambda_2$



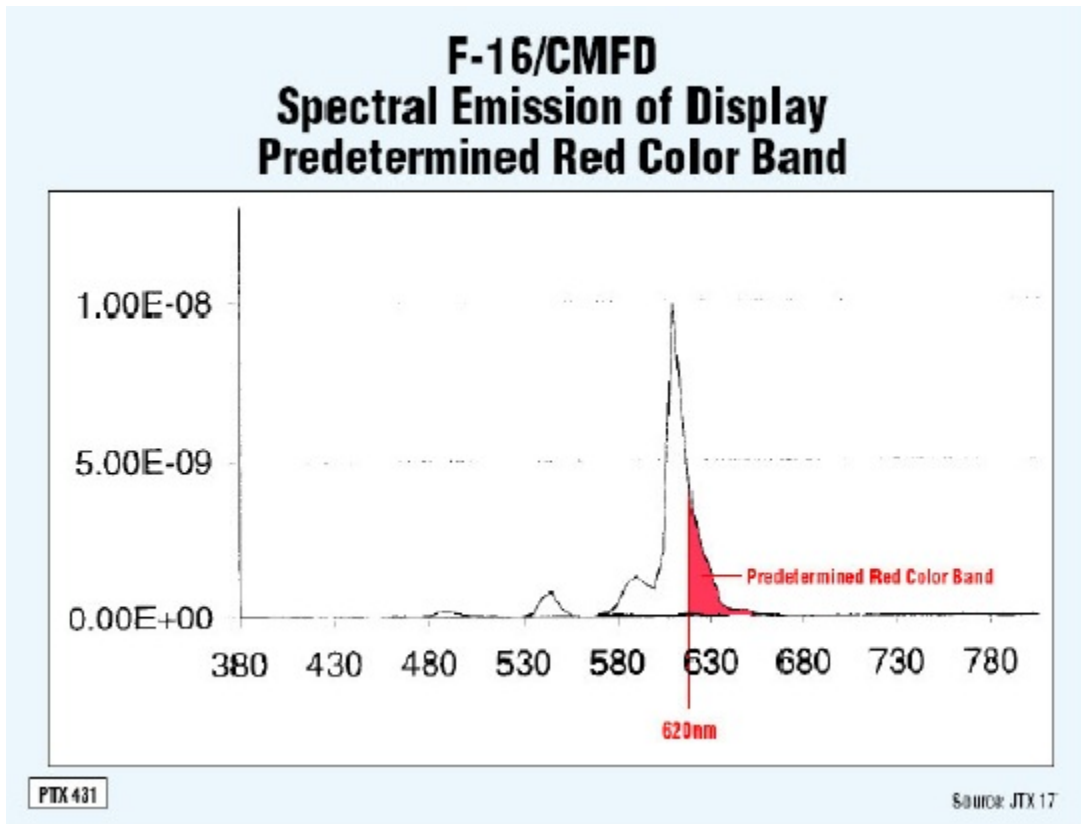
PTX 428



Source: JTX 75 and JTX 1

PTX 428.

Therefore, Mr. Tannas concluded that the spectral emission of the F-16 CMFD display evidences that the emission of a “predetermined red color band” around 620 nm to 668 nm, within the 620 nm to 780 nm, construed by the court as the “red color band.” See PTX 446 (Tannas Direct) ¶ 124 (referencing PTX 430); see also TR 212 (Wood testifying that “roughly this edge is at 600 nanometers, and this edge is at 660 nanometers would be the combination of the color pixel filter with the night vision filter[.]”). Mr. Tannas estimated that the emission spectrum of the red primary is in a range of wavelengths above 620 nm that is 5 nm to 20 nm wide. *Id.* ¶¶ 125-27.



PTX 431; *see also* TR 740-41.

Mr. Tannas also testified that the spectrum of light emission for the [deleted] lamp in the C-130H/RDU and C-130J/CMDU emits light at wavelengths in the range of [deleted] nm to [deleted] nm, [deleted]. *See* PTX 446 (Tannas Direct) ¶ 134.

[deleted]

PTX 433; *see also* TR 686, 1064 (Tannas).

As PTX 434 also demonstrates, the light emitted from the [deleted] lamps in the C-130J/CMDU and C-130H/RDU include a predetermined red color band in the range of [deleted] nm to [deleted] nm that is passed and emitted by the display.

Mr. Tannas stated that the effect of the lamp filter is to split the red color band into two sub-bands, so that one sub-band is passed by the lamp filter and emitted by the display, and the other sub-band is blocked and not emitted by the display.

[deleted]

PTX 434.

Mr. Tannas also testified that the “emission spectrum for the red primary of the RDU [also] shows that [deleted] passes a predetermined or narrow band  $\lambda_1$  of the red color band.” PTX 446 (Tannas Direct) ¶ 136.

Likewise, in the C-130J/CMDU, the[deleted] filter splits the red color band into sub-band  $\lambda_1$  [deleted] passes a predetermined narrowband of the red color band and  $\lambda_2$  that is blocked. *See* PTX 446 (Tannas Direct) ¶ 149; PTX 438. The emission spectrum for the red color display of the CMDU shows a range of wavelengths above [deleted] nm that is about [deleted] nm to [deleted] nm wide:

[deleted]

PTX 441; *see also* JTX 19 at L-3001120-1122; PTX 6 at LHM00721.

### iii. The Government’s Response.

The Government responded that none of the accused devices include a “red color band,” construed by the court, *i.e.*, “a range of color from 620 nm to 780 nm,” and therefore the “predetermined red color band” limitation cannot be satisfied. *See* Gov’t PT Mem. at 31. The Government argues that, during the claim construction hearing, Honeywell’s counsel conceded that if the court held that the lower limit of the red color band was 622 nm that construction would preclude finding infringement of the ‘914 patent. *Id.* at 31 (citing claim construction hearing transcript at 1118, wherein Honeywell’s counsel stated: “[N]o display that’s out there would even infringe at 622.”). Although the court did not adopt Honeywell’s construction that the “red color band” lower boundary commences at 600 nm, nevertheless, the Government asserts that “Honeywell has attempted to preserve its case by applying an analysis for the red color band that makes the Court’s 620 nm boundary irrelevant, and converts the claim construction into the very type of subjective, perception-base test the [c]ourt rejected.” *Id.* at 32; *see also id.* at 32-33.

The Government advanced four arguments to counter Honeywell’s contention that the accused devices include a “red color band.” First, the spectral energy distributions used by Mr. Tannas are criticized, because they show only whether light has a *range of power* between 620 nm and 780 nm, not whether they measure a “*range of color* from 620 nm to 780 nm. *Id.* at 40 (emphasis added). Therefore, the Government recommended that the court use the CIE color chart, since both experts agreed that this was an accepted “objective” reference, because a particular color is denoted by coordinates based on wavelength, rather than name. *Id.* at 33-34 (citing TR 631-32, 1046; DE 202 at 21).

Second, the Government argued that the spectral energy or power emitted by the designated displays overlooks the significance of red in the context of the ‘914 patent, *i.e.*, the display must create a red *color that can be seen by the pilot*, regardless of how much power is emitted. *Id.* at 42 (emphasis added). More importantly, the Government argues that if Honeywell’s analysis is adopted, any display that emits a majority, but not all, of the light outside the “red color band,” would infringe the ‘914 claims. *Id.*; *see also* TR 1068. In other words, Honeywell’s analysis ascertains only whether

light is measurable, *i.e.*, in the 620 nm to 780 nm range, not whether that light is visible or whether other light also is emitted at the same time. Gov't PT Mem. at 42-43.

The Government's third argument is, because 88.9% of light emitted by the designated displays is outside the red color band, that fact cannot be ignored, since the pilot cannot distinguish between the light within the red color band from outside light or "view each separately." *Id.* at 44.

Finally, the Government challenged Honeywell's contention that "[a]s long as the dividing line between  $\lambda_1$  and  $\lambda_2$ , [*i.e.*, light emitted by the lamp,] is in the range from 620 to 780 nm, then there will be a range of wavelengths  $\lambda_1$  that comprise a 'predetermined red color band.'" *Id.* at 46 (citing Pl. PT Mem. at 49). The Government responded that "neither the actual light emitted by the display, [n]or the color that reaches the viewer, is relevant to whether the display emits a red color band." *Id.*

#### **iv. The Intervenor's Response.**

Lockheed Martin responded that the CMDU in particular cannot literally infringe the '914 patent, unless "the *majority of the wavelengths* that constitute the red color band emitted by the display . . . are made up of a range of wavelengths between 620 nm and 780 nm." Int. Reply at 48 (emphasis added). The "vast majority of most of the energy produced by the so-called 'red primary' of the CMDU is in a range between [deleted] nm and [deleted] nm, not [deleted] nm and [deleted] nm." *Id.* at 49 (citing PTX 424). In fact, Dr. Task testified that only 5.8% of the luminance of the red primary falls within the 620 nm to 780 nm range. *Id.* at 49 (citing DE 202 Task Direct ¶¶ 59-61); *see also* TR 1055-56. Therefore, Lockheed Martin contended that the CMDU does not infringe the '914 patent, because the "red primary does not produce a red color band as defined by the [c]ourt and as established by the express language of the specification." Int. Reply at 49.

Honeywell asserted that since Lockheed Martin and L-3 Communications referred to the energy emitted by the backlight "red," this evidenced that the court's construction of the "red color band" was satisfied. *See* Pl. PT Reply at 29. Lockheed Martin responded that what the energy from the backlight is called is irrelevant, because "the bands at which most of the energy is emitted by the backlight is not within the [c]ourt-defined range of 620 to 780 nm." Int. Reply at 49-50. [deleted]. *See* PTX 310 (7/27/05 Walsh Dep. at 354).

Second, Honeywell, asserted that the red color band limitation in Claims 1(a) does not require substantial red energy, only that the CMDU produce red energy that is measurable. Lockheed Martin responded that there is no evidence in the record that CMDU produces red energy that can be detected by the human eye. *See* Int. Reply at 55.

#### **v. The Court's Determination Regarding Infringement.**

Claim 1 requires that "light from the local color display" must "show or exhibit at least one color perceptible to an observer or observers," wherein "said first optical filter . . . passes light . . . including a predetermined red color band[.]" *See* JTX 1 ('914 patent, col. 6, ll. 1-4). Claim 1 includes a "local color display" limitation that the court construed to mean a display "that shows

or exhibits at least one color perceptible to an observer or observers who may be located near or in proximity to the ‘local display system.’” *Honeywell*, 66 Fed. Cl. at 444. As the court explained, “a display system would be irrelevant without an observer or observers capable of perceiving the display, necessarily a ‘local color display’ also must be perceptible to an observer or observers, *i.e.*, one utilizing a night vision aid.” *Id.* Therefore, the court construed that the predetermined red color band must not only be “a specific range of wavelengths within the red color band,” *i.e.*, 620 nm to 780 nm, but also that the “local color display” limitation in Claim 1 requires that the predetermined red color band be perceptible to an observer or observers utilizing the night vision aid.

[deleted], Claim 1 of the ‘914 patent requires only that the “local color display” emit light within the “red color band,” *i.e.*, 620 nm to 780 nm, that is perceptible. Claim 1 does not require that a majority of the wavelengths, or any specific percentage thereof, be within the red color band or that other light be excluded, nor does Claim 1 require that light emitted be perceived as red. *See* TR 389 (Tannas: “Well, perception is not part of any of the claim construction, nor the patent or anything.”); TR 453 (Tannas: “[T]he actual color that the pilot sees is not part of the patent.” The court: “It’s not relevant.”); TR 468-69 (Tannas: “There’s no criteria, no test, no claims or claim construction [that the predetermined red color band has to be substantial energy]. . . . It has to be measurable.”).

Since light emitted from each of the designated displays, as measured by a spectroradiometer, is within the 620 nm to 780 nm wavelengths, construed by the court to be the “red color band,” and also is perceptible, the court has determined that each of the designated displays literally infringes the predetermined red color band limitation of Claim 1. *See* JTX 4 (emission spectrum for the [deleted] lamp in the C-130 H/RDU and C-130J/CMDU); JTX 25 (RDU lamp filter transmittance); JTX 39 ([deleted] filter in CMDU); JTX 50 at H57131 (CMFD optical filter); PTX 255 (transmission spectrum for [deleted] filter in CMFD); PTX 310 (7/27/05 Walsh Dep. at 375) (“The [deleted] filter will emit a very, very small amount of energy about [deleted] nanometers and there is a little bit of light coming from the [deleted] above [deleted] nanometers.”); *see also id.* at 401-04; PTX 425 (emission spectrum for TB-29 lamp in the F-16/CMFD); PTX 431, PTX 436, PTX 440; TR 456, 469 (Tannas); TR 623 (Tannas testified that in the CMFD “there’s a little bit of light that also sneaks through that red primary filter.”).

\* \* \*

The court has determined that the designated displays literally infringe the “predetermined red color band” limitation in Claim 1. Literal infringement, however, requires that the designated displays “embody each of the limitations of the asserted claim.” *See V-Formation, Inc. v. Benetton Group SpA*, 401 F.3d 1307, 1312 (Fed. Cir. 2005) (“Literal infringement requires that each and every limitation set forth in a claim appear in an accused product.”). For the reasons discussed herein, the court has determined that the designated displays do not include a “notch filter,” as stipulated by the parties and construed by the court. Therefore, Honeywell did not establish, by a preponderance of the evidence, literal infringement as to Claim 1 of the ‘914 patent in this case.

## **2. As To Claim 2 Of The ‘914 Patent.**

In order to prove literal infringement, as to Claim 2 of the ‘914 patent in this case, Honeywell must establish by a preponderance of the evidence that the contested limitations, *i.e.*, a “plurality of filters at the local color display” and “substantially blocks,” are present in the designated displays.

### **a. A “Plurality Of Filters At The Local Color Display.”**

#### **i. The Court’s Construction Of A Plurality Of “Filters At The Local Color Display.”**

Claim 2 requires “a plurality of filters at the local color display[.]” JTX 1 (‘914 patent, col. 6, l. 16). The parties stipulated that “filters,” used as a plural noun, means “two or more filters.” *Honeywell*, 66 Fed. Cl. at 448. The court construed “local color display” to be a “device that may be used together or in combination with optical filters.” *Honeywell*, 66 Fed. Cl. at 444. The court also construed “local color display” in Claim 2(a) to include “a source of light having blue, red and green color bands.” *Id.* The court also construed that the “plurality of filters at the local color display” in Claim 2 of the ‘914 patent are not “limited to a location internal or external to the local color display.” *Id.* (citing ‘914 patent, col. 6, ll. 15-22).

#### **ii. The Plaintiffs’ Contention.**

Honeywell contended that the preponderance of evidence establishes that each of the designated displays has two or more filters, and that the “plurality of filters” limitation in Claim 2 includes the lamp filter and at least a blue pixel filter and a green pixel filter. *See* Pl. PT Mem. at 71-72 (citing PTX 426 (Tannas Direct) ¶¶ 173-75). Honeywell described the blue pixel filter as “a first filter for filtering the blue color band at the local source of light.” *Id.* at 72. The green pixel filter also was identified by Honeywell as “a second filter of filtering the green color band of the local source of light.” *Id.* In addition, the lamp filter was identified as “a third filter for filtering the red color band at the local source of light and passing a narrowband of the red color band.” *Id.* (citing JTX 1 (‘914 patent, col. 6, ll. 17-23); PTX 446 (Tannas Direct) ¶¶ 180-82, 187-89, 195, 197, 199; TR 321-22 (Wood); TR 1020 (Task)). Honeywell, however, conceded that initially it took the position that the “third filter” was the combination of the lamp filter and red pixel filter, but later argued that testimony at the infringement hearing supported an alternative finding that the lamp filter alone satisfied the third filter requirement in Claim 2(a)(3). *Id.* at 72-73 (citing TR 574, 575, 578-79, 591, 594, 1036 (Tannas)).

In the alternative, Honeywell argued that the “third filter” requirement is satisfied by the combination of the lamp filter and red pixel filter in the designated displays. *Id.* at 73 (citing TR 673-74 (Tannas)). In Claim 2(a)(3), the lamp filter alone satisfies the requirement for a “third filter,” therefore, Dr. Task’s criticism that two filters cannot be combined to find literal infringement in Claim 2 is irrelevant. *Id.* at 73. Honeywell also contested Dr. Task’s opinion that the green and blue pixel filters are not a “plurality of filters,” because the filters do not “create” the green and blue color bands. *Id.* at 73 (citing DE 202 (Task Direct) ¶ 68; TR 1033 (Task)). Instead, Honeywell asserted

that “the green and blue color bands are created by the local source of light, not the pixel filters.” *Id.* at 73 (citing TR 553 (Tannas) (“Filters never generate anything.”)). Therefore, even if no perceptible colors would be displayed if the pixel filters were removed, because “[n]othing in the claims or established construction requires that the display be capable of displaying colors in the absence of the ‘plurality of filters.’” *Id.* at 73.

### **iii. The Government’s Response.**

The Government responded that the designated displays did not use a “plurality of filters” for achieving NVG compatibility. *See* Gov’t PT Mem. at 48 (“Even Honeywell’s own expert, Mr. Tannas, admitted that the essential ingredient of the patent was performed by the lamp filter—only one filter.”) (citing TR 578-79 (Tannas: “I’m not sure I would necessarily characterize one particular element providing the core. The light source, the lamp filter, and the local color display filters do all of the filtering, so they act together to complete the task. . . . If you focus down to one essential ingredient, [the lamp filter] would be the essential ingredient.”)). Accordingly, the Government argued that the only way Honeywell can identify a “plurality of filters” is to combine the color pixel filter “arrays” together with the lamp filter. Moreover, since the pixel array is a “necessary component” of the “local color display,” it is impermissible for Honeywell to employ “double inclusion.” *Id.* at 48. The Government also asserted that the court construed “display system” such that the “essential elements” are filters at the local color display and night vision aid. *Id.*

### **iv. The Intervenor’s Response.**

Lockheed Martin responded that the “display system” and “local color display” are separate and distinct limitations in Claim 2. *See* Int. Sur-Reply at 16. In other words, the CMDU’s “local color display” must be able to produce color without relying on the optical filters required in the “display system.” *Id.* Accordingly, the “local color display” Claim 2 limitation must be satisfied by filters other than those used with the “local color display.” *Id.* Since [deleted], at least two of the three color filters of Claim 2 are not present in the CMDU and CMDU cannot infringe Claim 2. *Id.*

### **v. The Court’s Determination Regarding Infringement.**

Claim 2 includes the limitation, a “*display system* for use in association with a light amplifying passive *night vision aid* and a *local color display*, including a local source of light having a blue, red, and green color bands, comprising: (a) a plurality of filters[.]” *See* JTX 1 (‘914 patent, col. 6, ll. 11-15) (emphasis added). The court has construed “display system,” as a “*system* comprised of optical filters that can be used *in combination with* an aid, with light amplifying, passive, and night vision qualities, and a display of colors.” *Honeywell*, 66 Fed. Cl. at 437 (emphasis added). The court also has construed “local color display,” as a “device that may be used *together or in combination with* optical filters and shows or exhibits at least one color perceptible to an observer . . . utilizing a night vision aid.” *Id.* at 444 (emphasis added).

Moreover, in construing the preamble limitations of the ‘914 patent, the court attempted to state with clarity that, “[t]he placement of the terms ‘night vision aid’ and ‘local color display,’ in the



prepositional phrase prior to the verb ‘comprising’ advised one of ordinary skill in the art that the claimed system *may include* or be used together or in combination with a ‘night vision aid’ and a ‘local color display.’” *Id.* at 436 (emphasis added). Likewise, the court determined that “the ‘914 patent optical filters are ‘essential elements’ thereof and that *a night vision aid and local color display may be included* or used together or in combination with these filters.” *Id.* at 437 (emphasis added). In addition, the court determined that the use of the transitional word “comprising” made the claim language was “presumptively open-ended.” *Id.* at 436 (citing *Gillette Co.*, 405 F.3d at 1371-72. (“Where a claim uses the “word ‘comprising’ transitioning from the preamble to the body [it] signals that the entire claim is presumptively open ended.”)). Therefore, according to the court’s construction, the ‘914 patent encompassed display systems with optical filters independent of those located in the night vision aid or local color display, but also display systems utilizing optical filters necessary to the night vision aid or local color display, because such filters may be “included.”

Each designated system has a lamp that emits a broad spectrum of light, including spectral emissions in the red, blue and green color bands. *See* PTX 446 ¶ 63 (“Each designated display has at least on fluorescent lamp . . . The spectrum of light emitted by these fluorescent lamps has red, green and blue color bands.”); TR 391 (Tannas) (testifying about the spectral emissions of the [deleted] phosphor mix in the CMDU and RDU lamps); TR 159 (Wood) (testifying about the spectral emissions of the TB-29 phosphor mix used in the CMFD back light).

Each designated system also contains a [deleted] filter that “passes the range of shorter wavelengths of the red color band ( $\lambda_1$ ) and blocks the range of longer wavelengths of the red color band ( $\lambda_2$ ).” PTX 446 (Tannas Direct) ¶ 64; *see also* TR 179-183 (Wood) (testifying about the CMFD lamp filter). In addition, the [deleted] filter passes wavelengths below [deleted] nm, thereby, passing a “narrowband [620 nm to 660 nm] of the red color band,” as construed by the court. *See Honeywell*, 66 Fed. Cl. at 487 (the narrow band of the red color band means “a narrow range of wavelengths within the red color band”). [deleted], Claim 2(a)(3) of the ‘914 patent requires only that the third filter pass a “narrow band at the red color band,” *i.e.*, a narrow range of wavelengths within 620 nm to 660 nm. The [deleted] filter, therefore, meets the “third filter for filtering the red color band of the local source of light . . . passing a narrow band of the red color band” limitations of Claim 2, because it passes wavelengths under 660 nm, thereby, passing a narrowband of wavelengths, 620 nm to 660 nm, in the red color band.

In addition to the lamp filter, each of the designated devices has an AMLCD comprised of red, blue, and green pixel filters. *See* PTX 446 ¶ 65; TR 462, 464-66 (Tanas) (testifying regarding the strip and delta arrangements of the sub-pixel filters); TR 334 (Wood) (testifying that the CMFD’s AMLCD contains red, blue, and green red sub-pixel filters), *see also* TR 334 (Wood) (“That one photon would only go through - if it actually hit an opening, it would go through one color pixel filter.”). The red, blue, and green pixel filters filter the red, blue, and green color bands emitted by the fluorescent lamp, as well as the lamp filter.<sup>16</sup> *See* PTX 446 (Tannas Direct) ¶ 66. Therefore, blue

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<sup>16</sup> Unlike the lamp filter, that only passes a narrow band of the red color band, the red pixel filters pass wavelengths above 600 nanometers, thereby, passing the entire red color band, as

and green pixel filters satisfy the “first filter for filtering the blue color band of the local source of light” and the “second filter for filtering the green color band of the local source of light” limitations of Claim 2, respectively.

Accordingly, the court has determined that Honeywell has established by a preponderance of the evidence that the designated displays literally infringe the limitations in Claim 2(a), because each contained a “plurality of filters at the local color display[,] including[:] (1) a first filter[, *i.e.*, the blue sub-pixel filter,] for filtering the blue color band of the local source of light[, *i.e.*, the night mode lamp,]; (2) a second filter[, *i.e.*, the green sub-pixel filter,] for filtering the green color band of the local source of light; and (3) a third filter[, *i.e.*, the lamp filter,] for filtering the red color band of the local source of light and passing a narrow band[, *i.e.*, passing wavelengths from 620 nm to 660 nm,] of the red color band[.]”

**b. “Substantially Blocks.”**

**i. The Court’s Construction Of “Substantially Blocks.”**

Claim 2(b) states:

a fourth filter which filters light at the night vision aid, said fourth filter cooperating with said plurality of filters to substantially block at least said narrowband of the red color band from being admitted to the night vision aid.

JTX 1 (‘914 patent, col. 6, ll. 24-28).

The court construed the “verb ‘block,’ at a minimum, as preventing light from the narrowband of the red color band from entering the night vision aid.” *Honeywell*, 66 Fed. Cl. at 482. The court reached this construction by determining that “[t]he use of the verb ‘being admitted’ renders the term ‘substantially blocks’ unnecessary surplusage, since if the light at issue is prevented from being admitted into the night vision aid, *ipso facto*, such light also is substantially blocked.” *Honeywell*, 66 Fed. Cl. at 482. In doing so, however, the court did not specify the amount of light from the narrowband of the red that must be prevented from being admitted to the night vision aid. Since this construction could be interpreted as requiring that all light be prevented from entering the night vision aid, the court clarifies that “substantially blocks,” as used in Claim 2(b), requires only that light from the narrowband of the red color band be prevented from being admitted to the night vision aid in an amount that permits the night vision aid to function. *See Pfizer*, 429 F.3d at 1377.

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construed by the court. *See Honeywell*, 66 Fed. Cl. at 471. Accordingly, the red pixel filters do not meet the “passing a narrow band of the red color band” limitation of Claim 2(a)(3).

**ii. The Plaintiffs' Contention.**

Honeywell contended that the “degree” of blocking required in Claim 2 is the same as Claim 1(b), *i.e.*, “substantially blocking.” *See* Pl. PT Mem. at 75. Therefore, Honeywell concluded that the minus blue filter on the lens of the NVG satisfies the court’s construction of “substantially blocks.” *Id.* “Indeed, the parties have stipulated that night vision goggles function acceptably when used in the presence of the designated displays. Nothing more is required by the language of [C]laim 2(b).” *Id.* (citing PTX 102, PTX 103, PTX 104).

**iii. The Government's Response.**

The Government responded that “substantially blocks” in Claim 2 requires the total blocking of red light from entering the NVG. Gov’t PT Mem. at 50. In support, Dr. Task testified that Claim 2(b) requires “a greater degree of ‘blocking’ than that in other claims, *i.e.*, ‘preventing from entering.’” DE 202 ¶ 77 (Task). The “minus-blue” filter for the AN/AVS-9 NVGs that are utilized with the designated displays, however, allows “*some* light from the narrowband of the red color band [to be] admitted to the night vision aid.” *Id.* ¶ 78; *see also id.* ¶ 79 (citing GVT058-0406, PTX 7 (the spectral transmission curves show that measurable light at all wavelengths for the red color band are admitted into the NVGs)).

**iv. The Intervenor's Response.**

Lockheed Martin did not contest Honeywell’s contentions regarding the “substantially blocking” limitation in Claim 2. *See* Int. Reply at 19-62.

**v. The Court's Determination Regarding Infringement.**

Although both the Government and Lockheed correctly argue that the filters located at the night vision aids do not prevent all light from the narrowband of the red color band from being admitted, neither contests that the filters prevent a sufficient or some amount of light from being admitted, so long as it does not interfere with the night vision aid. *See* Gov’t PT Mem. at 50; Int. Reply at 19-62. Accordingly, the court has determined that the “substantially blocks” limitation of Claim 2 is literally infringed.

\* \* \*

For the reasons discussed herein, the court has determined that the designated displays literally infringe Claim 2 of the ‘914 patent.

**4. As To Claim 3 Of The ‘914 Patent.**

Although the court has determined that Honeywell established that the designated displays literally infringed Claim 2, nevertheless, the court has determined that Claim 3 is not infringed,

because the designated displays do not include a “narrowband of the red color band [that] is substantially five to twenty-five nanometers.”

**a. The Court’s Construction Of “The Narrowband Of The Red Color Band Is Substantially Five To Twenty Nanometers Wide.”**

At the claim construction hearing, the parties stipulated that the term “narrowband of the red color band” means a “narrow range of wavelengths within the red color band.” *Honeywell*, 66 Fed. Cl. at 487. As previously discussed, the court construed “the red color band” as having a “lower end of . . . 620 nm . . . [and] . . . an upper end range of 780 nm.” *Honeywell*, 66 Fed. Cl. at 471.

**b. The Plaintiffs’ Contentions.**

Honeywell contends that a preponderance of the evidence establishes that “in each of the designated displays, the ‘narrowband of the red color band is substantially five to twenty nanometers wide,’ as recited in claim 3.” Pl. PT Mem. at 75. Specifically, Honeywell relies on Mr. Tannas’ testimony that “measuring the width of the ‘narrowband of the red color band,’ namely full width at half height,” shows that “the ‘narrowband of the red color band,’ in the CMFD, RDU, and CMDU displays [were] [deleted] nm, [deleted] nm, and [deleted] nm, respectively. Each of these bandwidths fall[s] squarely within the 5 to 20 nm range specified in claim 3.” *Id.* at 75-76 (citing PTX 446 (Tannas Direct) ¶¶ 204-05 at 66; TR 967).

**c. The Government’s Response.**

The Government contends that since Honeywell failed to establish the designated displays have a “red color band,” *ipso facto*, Honeywell cannot satisfy the designated displays utilize a “narrowband of the red color band [that] is substantially five to twenty nanometers wide.” Gov’t PT Mem. at 47. The Government also challenges Mr. Tannas’ method of measuring the “edge” or “shoulder” of the peak by measuring the width of a band emission. *Id.* The Government argues that the “proper method” of determining the width of the band emission is, as Dr. Task testified, to measure “the width of the peak or band at 5% of its maximum transmission, since the ‘914 patent is concerned with minimizing the amount of the light leakage outside the narrowband that might interfere with the goggles.” *Id.* (citing DE 202 ¶¶ 80-87). If one of the designated displays at issue *had* a red color band, Dr. Task would have used that measurement to determine the width of the band. *Id.* Since none of the displays had a red color band, Dr. Task determined that no measurement could be taken. *Id.*

**d. The Intervenor’s Response.**

Lockheed Martin concedes that, although the CMDU emits *some measurable energy between 629 nm and 780 nm*, “Honeywell did not establish that this ‘red’ energy would be detectable by the observer’s eye[.]” Int. Reply at 61 (citing TR 396) (emphasis added). The facts also did not establish that the “narrowband of red energy produced by the CMDU does not consist of the band of energy at which most light is transmitted by the red display transducer.” *Id.* The patent specification

provides that “the narrow color band may be defined . . . as the band at which most light is transmitted by a phosphor coating on the CRT, typically a five to twenty nanometer band.” JTX 1 (‘914 patent, col. 5, ll. 9-12); *see also* ID 7 at ID-2800-2801. The energy Honeywell claims is the red color band that “transmits the vast majority of its energy between 607 nm and 620 nm—outside the red color band,” moreover, Lockheed Martin asserts that “[no] red color band [is] produced by the CMDU [and] there is no filter [that] passes a red color band.” *See* Int. Reply at 62.

**e. The Court’s Determination Regarding Infringement.**

Honeywell failed to establish by a preponderance of the evidence that Mr. Tannas’ method of measuring the “edge” or “shoulder” of peak energy of the designated systems is an established method of measuring the width of a band emission, utilized or recognized by one ordinarily skilled in the art. For this proposition, Honeywell offered no other evidence. Therefore, the court has determined that Honeywell did not establish, by a preponderance of the evidence, that the designated displays included a “narrowband of the red color band [that] is substantially five to twenty-five nanometers wide.”

**F. Controlling Precedent Concerning Infringement Under The Doctrine Of Equivalents.**

In *Freedman Seating Co. v. American Seating Co.*, 420 F.3d 1350 (Fed. Cir. 2005), the United States Court of Appeals for the Federal Circuit recently provided a definitive statement regarding the purpose and application of the doctrine of equivalents that warrants repeating in its entirety:

Under the doctrine of equivalents, “a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is ‘equivalence’ between the elements of the accused product or process and the claimed elements of the patented invention.” *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997) (citing *Graver Tank*, 339 U.S. at 609, 70 S.Ct. 854). The doctrine evolved in recognition of the fact that

The language in the patent claims may not capture every nuance of the invention or describe with complete precision the range of its novelty. If patents were always interpreted by their literal terms, their value would be greatly diminished. Unimportant and insubstantial substitutes for certain elements could defeat the patent, and its value to inventors could be destroyed by simple acts of copying.

*Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731, 122 S.Ct. 1831, 152 L.Ed.2d 944 (2002); *Graver Tank*, 339 U.S. at 605, 70 S.Ct. 854 (“[T]o permit imitation of a patented invention which does not copy every literal detail would be to convert the protection of the patent grant into a hollow and useless thing.”). At the same time, the doctrine of equivalents necessarily adds uncertainty to the scope

of patent claims, and thereby detracts from the public-notice function of patent claims and risks deterring non-infringing and potentially innovative endeavors. *See Festo*, 535 U.S. at 727, 122 S.Ct. 1831 (“If the range of equivalents is unclear, competitors may be unable to determine what is a permitted alternative to a patented invention and what is an infringing equivalent.”); *Warner-Jenkinson*, 520 U.S. at 29, 117 S.Ct. 1040 (“There can be no denying that the doctrine of equivalents, when applied broadly, conflicts with the definitional and public-notice functions of the statutory claiming requirements.”). In recognition of this risk, and in an effort to strike the proper balance between protecting patentees while also providing sufficient notice to the public, various rules of law have emerged to constrain when and how the doctrine of equivalents is to be applied.

*Freedman Seating*, 420 F.3d at 1357-58.

One is the “all limitations rule.” *Id.* at 1358. In a case premised on the doctrine of equivalents, the United States Court of Appeals for the Federal Circuit has explained that the “all limitations rule” has “two primary implications”:

First, the all limitations rule requires that equivalence be assessed on a limitation-by-limitation basis, as opposed to from the perspective of the invention as a whole. Second, an element of an accused product or process is not, as a matter of law, equivalent to a limitation of the claimed invention if such a finding would entirely vitiate the limitation. *Warner-Jenkinson [Co., Inc. v. Hilton Davis Chemical Co.]*, 520 U.S. 17, 29 (1997)] (“It is important to ensure that the application of the doctrine . . . , even as to an individual element, is not allowed *such broad play as to effectively eliminate that element in its entirety*.”); *Lockheed Martin Corp. v. Space Sys./Loral, Inc.*, 324 F.3d 1308, 1321 (Fed. Cir. 2003) (“[I]f a court determines that a finding of infringement under the doctrine of equivalents ‘would entirely vitiate a particular claim[ed] element,’ then the court should rule that there is no infringement under the doctrine of equivalents.”).

*Id.* at 1358 (selected citations omitted) (emphasis added); *see also Asyst Techs., Inc. v. Emtrak, Inc.*, 402 F.3d 1188, 1195 (Fed. Cir. 2005).

When, however, an element in the “accused subject matter performs substantially the *same function* as the claimed limitation in substantially the *same way* to achieve substantially the *same result* [such findings] may be relevant to [the equivalence] determination.” *Ethicon Edo-Surgery, Inc. v. United States Surgical Corp.*, 149 F.3d 1309, 1315 (Fed. Cir. 1998) (emphasis added); *see also Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934-35 (Fed. Cir. 1987) (*en banc*) (“Under the doctrine of equivalents, infringement *may* be found (but not necessarily) if an accused device performs substantially the same overall function or work, in substantially the same way, to obtain substantially the same overall result as the claimed invention. That formulation, however, does not mean one can ignore claim limitations.”).

Therefore, our appellate court, recognizing that “[t]here is no set formula for determining whether a finding of equivalence would vitiate . . . the all limitations rule[,] . . . [has instructed that a trial court] *must consider the totality of the circumstances* of each case and determine whether the alleged equivalent can be fairly characterized as an insubstantial change from the claimed subject matter without rendering the pertinent limitation meaningless.” *Freedman Seating*, 420 F.3d at 1359. A recommended model for “the multi-factored analysis required is *Ethicon Endo Surgery Corp. v. U.S. Surgical Corp.*, 149 F.3d 1309, 1317-21 (Fed. Cir. 1998).” *Id.*

In *Ethicon*, the trial court declined to find infringement under the doctrine of equivalents on summary judgment as to two claims. *See Ethicon*, 149 F.3d 1309. The United States Court of Appeals for the Federal Circuit affirmed the trial court’s finding on one claim, but reversed the trial court’s finding on the other, because the defendant’s reading of *Dolly, Inc. v. Spalding & Evenflo Co., Inc.*, 16 F.3d 394 (Fed. Cir. 1994); *Wiener v. NEC Electronics, Inc.*, 102 F.3d 534 (Fed. Cir. 1996); and *Sage Products, Inc. v. Devon Industries, Inc.*, 126 F.3d 1420 (Fed. Cir. 1997):

would force the All Elements rule to swallow the doctrine of equivalents, reducing the application of the doctrine to nothing more than a repeated analysis of literal infringement. Once a negative determination of literal infringement is made, that failure to meet a limitation would preclude a finding of infringement under the doctrine. The doctrine of equivalents would thus be rendered superfluous . . . because a finding of non-infringement would be foreordained when a court has already found that the accused subject matter does not literally fall within the scope of the asserted claim. However, any analysis of infringement under the doctrine of equivalents *necessarily* deals with subject matter that is “beyond,” “ignored” by, and not included in the literal scope of a claim. Such subject matter is not necessarily “specifically excluded” from coverage under the doctrine unless its inclusion is somehow inconsistent with the language of the claim. Literal failure to meet a claim limitation does not necessarily amount to “specific exclusion.”

*Id.* at 1317 (emphasis in original). Our appellate court emphasized that *Dolly*, *Wiener*, and *Sage* were decided on the “facts presented [where] no reasonable finder of fact could have found infringement of equivalents because the differences between the allegedly infringing devices and the claimed inventions were plainly not insubstantial.” *Id.* at 1318; *see also id.* at 1321 (observing that “a subtle difference in degree, not a clear, substantial difference or difference in kind . . . equivalence” may be established by the finder of fact).

The trial court’s finding of non-infringement under the doctrine of equivalents as to the other claim was reversed, because “[o]ne-to-one correspondence of components is not required, and elements or steps may be combined without *ipso facto* loss of equivalency.” *Id.* at 1320 (citation omitted). Stated differently, “two physical components of an accused device may be viewed in combination to serve as an equivalent of one element of a claimed invention, as long as no claim limitation is thereby wholly vitiated.” *Ethicon*, 149 F.3d at 1320. Again, the appellate court emphasized that the *Ethicon* holding was “based on several considerations, [including] the simplicity

of the structure, the specificity and narrowness of the claim, and the foreseeability of variations at the time of filing the claim with the PTO.” *Freedman Seating*, 420 F.3d at 1360.

Another case, cited with approval by the United States Court of Appeals for the Federal Circuit, is *Sage*, where the trial court’s judgment of non-infringement under the doctrine of equivalents was upheld, because a finding of infringement under the circumstances in that case would vitiate two limitations. *Id.* at 1360-61. In that case,

[t]he claim at issue defines a relatively simple structural device. A skilled patent drafter would foresee the limiting potential of the “over said slot” limitation. No subtlety of language or complexity of the technology, nor any subsequent change in the state of the art, such as later-developed technology, obfuscated the significance of this limitation at the time of its incorporation into the claim. If [the patentee] desired broad patent protection for any container that performed a function similar to its claimed container, it could have sought claims with fewer structural encumbrances. . . . Instead, [the patentee] left the PTO with manifestly limited claims that it now seeks to expand through the doctrine of equivalents. However, as between the patentee who had a clear opportunity to negotiate broader claims but did not do so, and the public at large, it is the patentee who must bear the cost of its failure to seek protection for this foreseeable alteration of its claimed structure.

*Sage*, 126 F.3d at 1425.

#### **G. The Court’s Determination Of Plaintiffs’ Claims Of Infringement Under The Doctrine Of Equivalents.**

Honeywell claims that, even if the court held that literal infringement of the ‘914 patent was not established, two limitations were infringed under the doctrine of equivalents: the “First Optical Filter” in Claim 1 and the “Plurality of Filters” in Claim 2. The court’s adjudication of infringement as to each of these claims under the doctrine of equivalents follows.

##### **1. The “First Optical Filter” Limitation In Claim 1.**

###### **a. The Plaintiffs’ Contention.**

Honeywell contends that the combination of [deleted] in the designated displays are equivalent to the “first optical filter” in Claim 1, because the [deleted] filter and [deleted] perform the *same function* as the “first optical filter,” by selectively passing light emitted by the local source of light and selectively blocking other wavelengths. *See* Pl. PT Mem. at 77-78 (citing PTX 446 (Tannas Direct) ¶ 217). In addition, the *function* of splitting the red color band is performed in substantially the *same way*, *i.e.*, by splitting the red color band emitted by the local source of light into  $\lambda_1$  and  $\lambda_2$ , passing a predetermined red color band  $\lambda_1$ , and blocking the remainder of the red color band  $\lambda_2$ . *See* Pl. PT Mem. at 76 (citing PTX 446 (Tannas Direct) ¶¶ 117-127, 133-139, 147-153, 217; PTX 427-41). The *same result* is achieved by combining [deleted] as the “first optical filter,” *i.e.*, achieving



a color display that is compatible with night vision goggles. *See* Pl. PT Mem. at 78 (citing Tannas Direct ¶ 217). Honeywell further asserts that any differences between the [deleted] combination at the designated display are insubstantial. *Id.*

HONEYWELL’S COUNSEL: Mr. Tannas, how does this paragraph [D of court’s Memorandum Opinion at 19] relate to your analysis of the requirement for a notch filter in Claim 1(a) of the ‘914 patent?

MR. TANNAS: Well, this paragraph describes how a notch filter can be made and the numbers that are used here in this example are appropriate for making a notch filter with two filters, with a high pass filter and a low pass filter.

HONEYWELL’S COUNSEL: And what difference does it make . . . Mr. Tannas, if any, that the light passes through two filters in the CMFD, as opposed to a single filter that would be a notch filter?

MR. TANNAS: None whatsoever; in fact, there’s even other filters that are not really relevant along the path. So all the filters that are along the path of the light beam have to be included, and their cumulative effect is as described in this paragraph.

HONEYWELL’S COUNSEL: And what difference does it make, if any, that the two filters that have a cumulative effect are spaced apart in the display?

MR. TANNAS: In the geometry shown in the drawings of the display that I viewed, that would make no effect whatsoever. They’re all lined up and appropriately positioned to do just this, to simply filter the light in a uniform way on its path from the lamp, from the backlight assembly, out the front of the display.

TR 701; *see also* TR 737 (Tannas).

Honeywell argues that the fact that the pixel filters are part of the local color display and contribute to the functionality of the display does not preclude a finding of infringement under the doctrine of equivalents. *Id.* at 83 (citing *Eagle Comtronics, [Inc. v. Arrow Communication Laboratories, Inc.]*, 305 F.3d at 1303, 1317 (Fed. Cir. 2002)]; *Ethicon*, 149 F.3d at 1320; *Sun Studs*, 872 F.2d at 989).

#### **b. The Government’s Response.**

The Government responds that Honeywell failed to establish a *prima facie* case as to the first “optical filter” of Claim 1, because Honeywell’s the lamp filter/red pixel filter combination does not perform substantially the same *function*, in substantially the *same way* to achieve substantially the *same result* as the claimed first “optical filter.” *See* Gov’t PT Mem. at 51 (citing *Pennwalt*, 833 F.2d at 934) (emphasis added). The Government argues that since all filters have the same “function,” *i.e.*, selectively passing some wavelengths and blocking others, and the same “way,” *i.e.*, the way of

performing the function, therefore, all filters would have the same “function” and “way” as the “first optical filter.” *Id.* at 51-52. In other words, Honeywell should not be able to “convert the ‘first optical filter’ of Claim 1(a) into a limitation that can be satisfied by *any filter* . . . in an NVG compatible display.” *Id.* at 52 (emphasis in original). In addition, the Government argues that the “result,” *i.e.*, “a color display that is compatible with night vision goggles,” is impermissibly broad. *Id.*

In addition, the Government asserts that the conclusory testimony of Mr. Tannas is insufficient to make a *prima facie* showing. *Id.* at 52-53 (citing *Honeywell Int’l, Inc. v. Universal Avionics Sys. Corp.*, 347 F. Supp. 2d 129, 134-35 (D. Del. 2004) (rejecting conclusory expert testimony without “linking argument.”)). The Government also challenges Honeywell’s mischaracterization of Dr. Task’s hypothetical testimony about whether a lamp filter and red pixel filters could be “glued together” to show that there are no significant differences between the accused devices and claimed structure. *Id.* at 53.

### **c. The Intervenor’s Response.**

Lockheed Martin takes a different tact, arguing that Honeywell’s “overall similarity” argument was solicited by Mr. Tannas for the purposes of establishing literal infringement, therefore, that evidence alone is insufficient to establish infringement under the doctrine of equivalents. *See* Int. Reply at 63-64 (citing *Texas Instruments, Inc. [v. Cypress Semiconductor Corp.]*, 90 F.3d at 1558, 1567 (Fed. Cir. 1996)) (“[P]articulated testimony and linking arguments are still important[.]”).<sup>17</sup>

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<sup>17</sup> Although both the Government and Lockheed Martin assert that Mr. Tannas’ testimony as insufficient to satisfy Honeywell’s burden to establish a *prima facie* infringement under the doctrine of equivalents, the United States Court of Appeals for the Federal Circuit has held that the testimony of a sole expert on “the ultimate issue of infringement is permissible in patent cases.” *See Symbol Technologies, Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1575 (Fed. Cir. 1991) (citing *Snellman v. Ricoh Co.*, 862 F.2d 283, 287 (Fed. Cir. 1988), *cert. denied*, 491 U.S. 910 (1989)). The burden then shifts to the “cross examination . . . [to elicit] the bases of an expert opinion.” *Id.* (quoting *Bryan v. FMC Corp.*, 566 F.2d 541, 545 (5th Cir. 1978)).

At several junctures during the hearing, the court *sua sponte* raised concerns about the underlying data relied on by Mr. Tannas in reaching his conclusions and preparing exhibits, particularly involving spectral distributions. *See, e.g.*, TR 385-91 (Tannas stated that PTX 440 “was provided by counsel to me that this was a representation of the energy being emitted from the CMDU. And here’s a plot of it.”), TR 664, 668 (Tannas stated that PTX 277 ([deleted] Spectral Plot) was a “team effort.”), TR 669 (Tannas stated that he prepared the draft of PTX 401-442, but “then it went to graphic arts and came back many channels.”), TR 743-46. The Government and Lockheed Martin apparently did not share the court’s concerns. *See* TR 744-46 (Honeywell’s Counsel: “I am happy to represent . . . that *we* didn’t prepare any underlying data or do any testing for the case, and everything Mr. Tannas relied upon is source documentation[.]”) (emphasis added). Neither the Government nor Lockheed ascertained precisely what information Honeywell’s counsel may have provided Mr. Tannas. *See* TR 385-91.

Specifically as to whether the combination of the [deleted] in the CMDU are the equivalent to the “first optical filter” in Claim 1(a), which also must be a “notch filter,” Lockheed Martin points out that Honeywell’s expert, Mr. Tannas, agreed that the CMDU [deleted] filter is a low pass filter with a wide band width and therefore is not equivalent to a notch filter. *See* Int. Reply at 65 (citing TR 486). Since the CMDU [deleted] filter allows for a large range of wavelengths to pass through the filter, in contrast to a notch filter that passes only a narrow range of wavelengths, therefore, the same *function* and result is not achieved as when the first optical filter is a notch filter. *Id.* (citing TR 486 (Tannas: [deleted])). The *result* also is different, because a notch filter only passes a narrowband of wavelengths, in contrast with the CMDU low pass filter that passes [deleted]. *Id.* In addition, because the filtering of the “red color band” is accomplished by the [deleted] filter before light reaches the [deleted] (citing PTX 432), it is improper and unnecessary to combine the [deleted] filter and [deleted]. *Id.* In sum, since the CMDU does not contain an equivalent of a first optical filter that is a “notch filter,” the CMDU does not infringe Claim 1(a) of the ‘914 patent under the doctrine of equivalents. *Id.*

Claim 1 requires a “first optical filter . . . wherein said first optical filter is a notch filter,” *i.e.*, “that has the capacity to pass in a narrowband (and substantially block in immediately adjacent bands) or has the capacity to substantially block in a narrowband (and pass in immediately adjacent bands)[.]” *Honeywell Int’l, Inc. v. United States*, No. 02-1909C (Fed. Cl. Aug. 4, 2005) (Order). Lockheed Martin argues that the CMDU substantially blocks only a portion of the red color band and passes all other color bands. *See* Int. Sur-Reply at 21. Therefore, the combination of the [deleted] filter and [deleted] filters in the CMDU does not perform the same function as the notch filter in the ‘914 patent. In addition, the CMDU performs the passing and blocking function in a different way because it uses a [deleted] filter [deleted]. *See* PTX 310 (Walsh Dep. at 23-25). The [deleted] filters serve no purpose to NVIS compatibility as they pass light within the red color band after splitting the red band takes places. *See* JTX 79 at 112-113; TR 594. Since the [deleted] do not split the red color band in the CMDU, as that function is performed solely by the [deleted] filter, there is no equivalence with the required ‘914 notch filter. Accordingly, Lockheed Martin concludes that the differences between the first optical filter limitation and the contrived [deleted] notch filter are substantial, because Honeywell’s “contrived” notch filter completely vitiates the local color display limitation and the [deleted] filter achieves night vision compatibility with the ANVIS filter as contemplated by Claim 1. *See* Int. Sur-Reply at 21-22.

#### **d. The Court’s Determination Regarding Infringement.**

The United States Court of Appeals for the Federal Circuit has held that: “[T]wo physical components of an accused device may be viewed in combination to serve as an equivalent of one element of a claimed invention[.]” *Ethicon Endo Surgery Corp. v. U.S. Surgical Corp.*, 149 F.3d at 1320. Therefore, it is appropriate for Honeywell to assert that the combination of the lamp filter and red pixel filter in the designated displays together perform the same function as the “first optical filter” in Claim 1, which is a notch filter. Nevertheless, the court has determined that the lamp filter

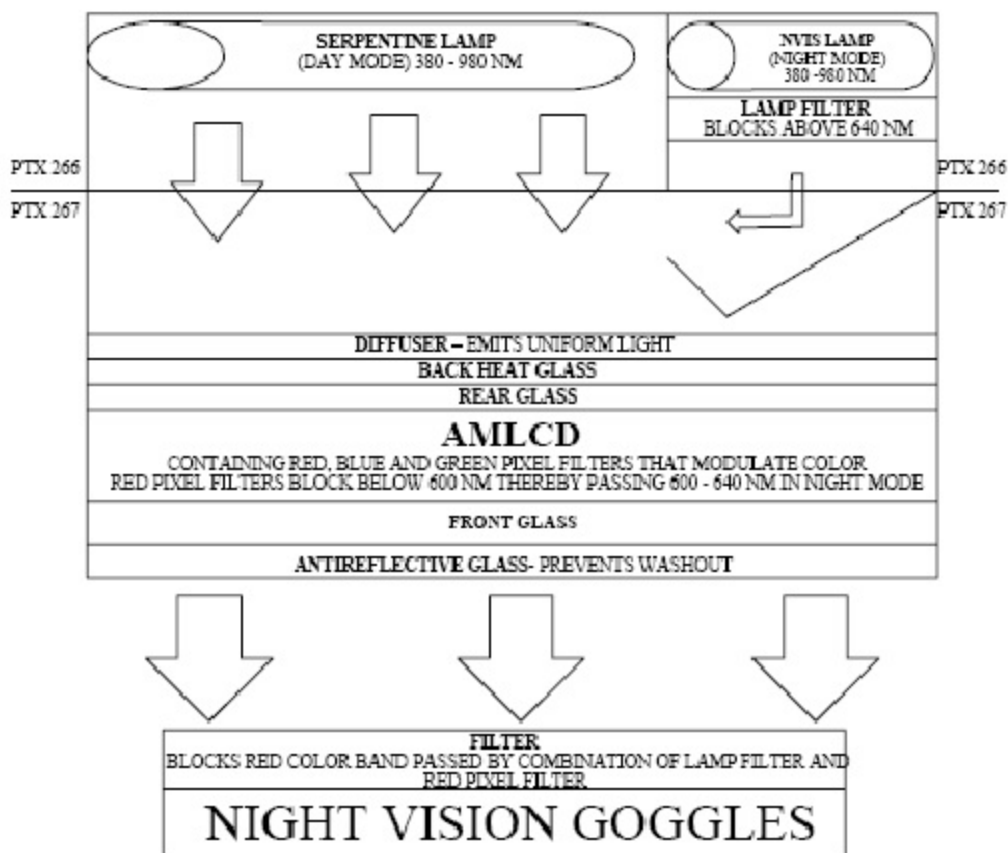
and red pixel filters in the designated displays are not equivalent to the “notch filter” limitation in Claim 1 of the ‘914 patent, because a finding of equivalences would vitiate a structural limitation of “notch filter.”

The court prepared the following exhibit that shows that the CMFD display system is comprised of two separate physical units. *See* PTX 266 and PTX 267 (a physical replica of both is in the record).<sup>18</sup> Each of these components, *i.e.*, “the color display,” “the night vision aid,” and “the optical filter” were “*necessary to practice the invention.*” TR 673 (Tannas emphasized that the lamp filter was a separate component from the “local color display [in that the local color display] has its own filters for display purposes, namely the red, green, and blue [pixel] filters.”) (emphasis added); *see also* PTX 415.

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<sup>18</sup> *See* TR 748-53 (Wood demonstration of: PTX 265, the lamp filter or NVIS filter, manufactured by WAMCO; PTX 266, the back light assembly for the CMFD, manufactured by LCD Lighting (combined known as the “display head assembly”); PTX 267, including the red, blue, and green color pixel filters manufactured by OIS and installed into the display housing). Honeywell assembles PTX 266 (of which PTX 265 is a component) into PTX 267 (PTX 269 picture); *see also* TR 281 (Wood affirmed that the lamp filter or NVIS filter is a “critical component” of the CMFD, because without the lamp filter the CMFD would not be NVG compatible); *see also* TR 672-73 (Tannas testified that there were three “key components” in the designated systems, including “the optical filters,” *i.e.*, the “lamp filter in front of the lamp and the minus blue filter in front of the NVG.”).

# CMFD DISPLAY SYSTEM



PTX 266 is the CMFD back light assembly that includes: a serpentine fluorescent light; a night mode lamp; and the lamp filter. The function of the lamp filter in PTX 266 is to split the red color band, *i.e.*, passing light below 660 nm and blocking light over 660 nm, thereby eliminating that portion of the red color band that would make the CMFD incompatible with NVGs.

PTX 266 is fitted into PTX 267, a separate display glass assembly, that includes: a diffuser; a back heat glass; a rear glass; AMLCD, including the pixel filters; a front glass; and an anti-reflective glass. The function of the pixel filters in PTX 267 is to provide a full color display for the pilot, modulating light that is NVG compatible to appear red, blue, and green. *See* TR 193.

Based on the testimony of Mr. Walsh and Mr. Tannas, the court also prepared the following exhibit that shows that the CMDU/RDU display system also is comprised of [deleted] distinct units.

[deleted]

As Honeywell's expert, Mr. Tannas recognized, the lamp filter is a "key component" of the '914 patent. *See* PTX 446 (Tannas Direct) ¶ 61; *see also* TR 672 (Tannas testified that the three

components of the '914 patent are the "local color display," the "night vision aid," and the "optical filters"), *compare with* TR 675 (Tannas testified that the key components that the '914 patent covers are: "the light source, the lamp filter, local pixel filter, and . . . the night vision goggle and minus blue filter[.]"). As previously discussed, the lamp filter's function is to split the red color band emitted by the fluorescent lamp into  $\lambda_1$  (comprising the range of shorter wavelengths of the red color band) and  $\lambda_2$  (comprising the range of longer wavelengths of the red color band). *See* PTX 446 (Tannas Direct) ¶ 64. When the red color band is split, a range of shorter wavelengths is passed and a range of longer wavelengths is blocked. *Id.* As Mr. Tannas advised the court: "*That's the geniusness of the patent.* The patent - the inventors took the red color band and, in an engineering sense, they made a design compromise. They left part of the red color band for the pilot. Then they left another part of the red color band to be used by the night vision goggle." TR 396 (emphasis added); *see also* TR 439-48 (Tannas discussing the specific language in '914 patent and specification that describes "the genius of the invention," that does not mention "notch filter"); TR 443 (Tannas: "Splitting the red color band is the nub of the patent."); TR 575 (Tannas: "[T]hat's the golden nugget of the patent, to form the separation. What you do at the end is not discussed in the patent.").

Mr. Walsh also testified about distinct functionality of the [deleted] filter in the CMDU.

LOCKHEED MARTIN'S COUNSEL: Again, could you just explain what role the [deleted] filter has with regard to the night vision mode?

MR. WALSH: Sure. *The purpose of the [deleted] filter, it's a cut-off filter, and it cuts off the energy from approximately [deleted] nanometers on throughout the infrared energy out to [deleted] nanometers and beyond.* The night vision goggles themselves become sensitive to light essentially above about, in this case, roughly 660 nanometers, and they are extremely sensitive throughout the infrared energy band from approximately 800 to 900 nanometers. So the purpose of the filter, then, is to remove that energy so that when the CMDU is used in night mode or, we're not emitting infrared energy that would affect the goggles. They don't emit energy that would in a sense scatter around the inside of the cockpit that would somehow cause the goggles to lose their sensitivity. It's called blooming.

LOCKHEED MARTIN'S COUNSEL: When you use the term "cut-off filter," when you use that term, how did you use that term?

MR. WALSH: Cut-off means - - the way I use it means it allows visible light to come through from roughly [deleted] nanometers out to about [deleted] nanometers, and then it cuts off, that is to say, it removes everything above approximately [deleted] nanometers. . . . I've drawn the [deleted] filter. As I've said, it's a cut-off filter, and by that I mean it has relatively high transmittance throughout the visible light range, passes light out to about [deleted] nanometers. At around [deleted] nanometers, just slightly before that, the transmission starts to drop very sharply. The 50 percent transmission filter is around [deleted] nanometers, and by the time you get out to

roughly [deleted] nanometers, the transmission is extremely low, like [deleted] or less, and it stays low all the way out past [deleted] nanometers.

PTX 310 at 341-43 (emphasis added).

\* \* \*

The [deleted] filter performs a distinct and most important function in the designated displays, *i.e.*, to achieve NVIS compatibility. The *function* of the red and other colored pixel filters in the designated displays, however, has nothing to do with splitting the red color band to create NVIS compatibility, but is a high pass filter that “separate[s] red, green, and blue for the three primaries of the local color display.” *See* TR 242-53, TR 579 (Tannas); TR 587-90 (‘914 patent does not require pixel filters).

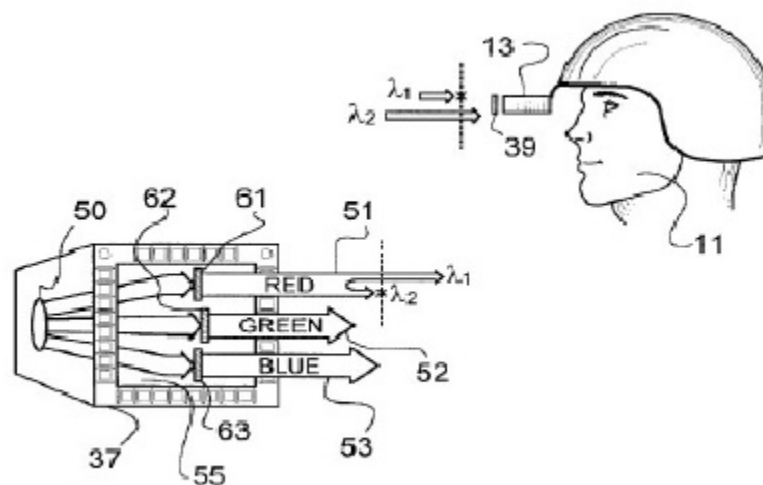
Although the doctrine of equivalents permits a finding of infringement through the combination of components, that doctrine “is not a license to ignore or erase structural and functional limitations of the claim.” *Athletic Alternatives, Inc. v. Prince Mfg., Inc.*, 73 F.3d 1573, 1581 (Fed. Cir. 1996) (quoting *Perkin-Elmer Corp. v. Westinghouse Elec. Corp.*, 822 F.2d 1528, 1532 (Fed. Cir. 1987) (emphasis added)).

In this case, the court has determined that the lamp filter and the red pixel filters combined are not equivalent to the notch filter limitation in Claim 1, because that finding would vitiate the structural limitations in the court’s construction of “notch filter,” *i.e.*, an optical filter “when used as a noun in the claims of the ‘914 patent means *a device* that selectively passes and blocks electromagnetic radiation.” *Honeywell*, 66 Fed. Cl. at 448 (emphasis added). The combined lamp filter and red pixel filters do not function as “a device.” Therefore, the court has determined that the designated displays do not infringe the “notch filter” limitation in the ‘914 patent under the doctrine of equivalents.

## **2. The “Plurality Of Filters At The Local Color Display” Limitation In Claim 2.**

### **a. The Plaintiffs’ Contention.**

Honeywell contends that the combination of the lamp filter and pixel filters in the designated displays are equivalent to the “plurality of filters,” since together they allegedly perform substantially the same function as the plurality of filters, *i.e.*, filtering the red, green, and blue color bands at the source of light. *See* Pl. PT Mem. at 81-82 (citing Tannas Direct at ¶¶ 173-75, 180-82, 187-89, 195, 197, 199, 217). Honeywell explains that the lamp filter and pixel filters in the designated displays perform the same function as in Figure 3 of the ‘914 patent. *See* Pl. PT Mem. at 82.



JTX 1 (Figure 3).

Honeywell argues that the lamp filter and pixel filters 61, 62, and 63 together filter light emitted by red, green, and blue phosphors in the local source of light. *Id.* at 82. In other words, the local source of light emits red, green, and blue color bands that are filtered by filters 61, 62, and 63 in Figure 3 or the lamp filter and green and blue pixel filters in the designated displays. *Id.* Filters 61, 62, and 63 and the pixel filters and lamp filter separate one local band from others, *e.g.*, filter 62 separates the green color band 52 emitted by the local source of light at 50, by passing the green color band 52 and blocking other light, including light in the range passed by filter 61. *Id.* Likewise, the green pixel filter in the designated displays filter the green color band emitted by the lamp filter and blocks other color bands. *Id.* at 82-83 (citing PTX 222, PTX 253, PTX 297); *see also* PTX 310 (Walsh Dep. at 91). Therefore, Honeywell concludes that the fact that the pixel filters are part of the local color display and play a role in enabling the local color display to display colors does not preclude the court from finding infringement under the doctrine of equivalents.

Honeywell contends that filtering of color bands at the source of light is performed in “substantially the *same way*,” *i.e.*, by “selectively passing the green and blue color bands and splitting the red color band emitted by the local source of light into two sub-bands,  $\lambda_1$  and  $\lambda_2$ , passing a narrowband  $\lambda_1$  of the red color band and blocking the remaining  $\lambda_2$  of the red color band.” *See* Pl. PT Mem. at 82 (citing PTX 222, PTX 253, PTX 297, PTX 427-441; *see also* PTX 446 (Tannas Direct) ¶¶ 117-127, 133-39, 147-153, 217; *see also* PTX 310 (Walsh Dep. at 87-88, 91).

In addition, Honeywell asserts that the lamp filter and pixel filters together achieve the *same result* as the plurality of filters, *i.e.*, to create a full color display that is night vision compatible. *See* Pl. PT Mem. at 82 (citing Tannas Direct ¶¶ 62, 72, 217; *see also* TR 136, 142-43; PTX 310 (Walsh Dep. at 26-27, 29); Battle Dep. at 35; Slusher Dep. at 35, 49). Any differences between the lamp filter



and pixel filters in the designated displays are said to be insubstantial from the claimed “plurality of filters” in Claim 2(a). *See* Pl. PT Mem. at 82.

**b. The Government’s Response.**

The Government responds that the lamp filter combined with the red, blue, and green pixel filters in the designated displays are not an equivalent of a “plurality of filters.” *See* Gov’t PT Mem. at 53. The Government states that the pixel filters do not perform the function of “filtering the red, green, and blue color bands of the local source of light,” as shown in Figure 3, but rather generate the colors of the local color display, as shown in Figure 3. *Id.* at 54. In other words, the “plurality of filters” only filter pre-existing red, blue, and green color bands. Therefore, Honeywell cannot establish that lamp filter and pixel filters in the designated displays are the equivalent of the “plurality of filters” limitation in Claim 2(a). *Id.*

**c. The Intervenor’s Response.**

Lockheed Martin did not respond to Honeywell’s contention that the lamp filter and pixel filters in the designated displays are equivalent to the “plurality of filters.” *See* Int. Reply at 62-63.

**d. The Court’s Determination Regarding Infringement.**

Claim 2(a) requires a “plurality of filters at the local color display[.]” *See* JTX 1 (‘914 patent, col. 6, l. 15). The court construed “local color display,” as used in Claim 2(a), “to include a source of light presenting at least one or more colors.” *See Honeywell*, 66 Fed. Cl. at 444. The “plurality of filters at the local color display” may be located “internal or external” to the “local color display.” *Id.*

As previously discussed, the [deleted] filter is a separate device and has the distinct function of separating the red color band to achieve NVIS compatibility. The red pixel filters are also separate devices, but have a different and distinct function of creating the local color display and, therefore, play no role in achieving NVIS compatibility.

Mr. Tannas testified, however, that “the red, green, and blue pixel filters in combination with the lamp filter of the designated displays . . . are equivalent to, . . . the plurality of filters in Claim 2.” PTX 446 ¶ 217. Together these filters “perform substantially the same function as the claimed ‘first optical filter’ and ‘plurality of filters,’ namely to filter light emitted by the local source of light and local color display.” *Id.* At the infringement hearing, Mr. Tannas, however, was unable to provide any specific evidence of whether the [deleted] filter and color pixels performed the same function as the “plurality of filters at the display system” or whether any differences were plainly not insubstantial.” *Ethicon*, 149 F.3d at 1318.

GOVERNMENT’S COUNSEL: I believe your testimony was that this is the light that goes through from the lamp through the [deleted] filter, through a number of other components, including the pixel filter and comes out the display?

MR. TANNAS: That's correct.

GOVERNMENT'S COUNSEL: How do you know what characteristics are being provided by which filter?

MR. TANNAS: I don't. I have a general idea that all the filters are operating, but what filter does what work, I didn't investigate that, and I didn't feel I had to.

TR 764.

On the other hand, Honeywell's fact witness, Mr. Wood, testified that there are three critical components in the CMFD that achieve full color and night vision compatibility. *See* TR 146 ("The three critical components would be the lamp that's being used to generate the light for the night mode, a filter that's put over the top of that lamp, and then the actual LCD that's used to generate the full color display."). To explain the functional significance of each of these components, Mr. Wood described the path that light generated in night mode follows, *i.e.*, first, light is generated by the night bulb (TR 154), then it passes through the lamp filter (TR 177), and third, passes through or is blocked by either a red, green, or blue sub-pixel filter (TR 334 ("That one photon would only go through - if it actually hit an opening, it would go through one color pixel filter.")). Significantly, Mr. Wood also testified about the spectral characteristics of the light at each of these stages: *i.e.*, wave lengths from 380 nm to 780 nm are emitted by the night bulb (TR 159 ("So in this particular case spectral emissions were measured from the lamp from 380 to 780 nanometers.") (citing JTX 49)); wavelengths from 400 nm to 660 nm are passed by the lamp filter (TR 177 ("The purpose of this filter primarily is to block wavelengths of light from 660 nanometers on out passed 930 nanometers. And it substantially passes wavelengths of light from 400 nanometers on up to 660 nanometers.")), (TR 182 ("At 660 nanometers, it can have no more than 5 percent transmission. And at 690 nanometers, it can have no more than 1 percent transmission.")); and wavelengths from 600 nm to 660 nm are passed by the red sub-pixel filter (TR 200-2 (in combination with the lamp filter the red sub-pixel filter passes 600 nm to 660 nm.)).

Moreover, Honeywell established that the CMFD function as a "plurality of filters at the local color display including: (1) a first filter [the blue sub-pixel filter] for filtering the blue color band of the local source of light [the night mode lamp]; (2) a second filter [the green sub-pixel filter] for filtering the green color band of the local source of light; and (3) a third filter [the red sub-pixel filter in combination with the lamp filter] for filtering the red color band of the local source of light and passing a narrow band [, *i.e.*, 600 to 660 nanometers due to the combination of the lamp filter and red sub-pixel filter,] of the red color band[.]"

Therefore, assuming *arguendo* that the court's determination that the "plurality of filters" limitation is literally met is erroneous, because "narrowband of the red color band" requires a blocking filter on both ends of the narrowband, the "plurality of filters" limitation, nevertheless, is infringed under the doctrine of equivalents. Accordingly, Honeywell established a *prima facie* case of infringement as to Claim 2 under the doctrine equivalents.

#### **IV. CONCLUSION.**

The court has determined that Honeywell failed to establish either literal infringement or infringement under the doctrine of equivalents as to Claim 1 and Claim 3 of the '914 patent.

The court, however, has determined that Honeywell established literal infringement as to Claim 2. In the alternative, the court also has determined that Honeywell established a *prima facie* case of infringement of Claim 2 under the doctrine of equivalents.

**IT IS SO ORDERED.**

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SUSAN G. BRADEN  
Judge